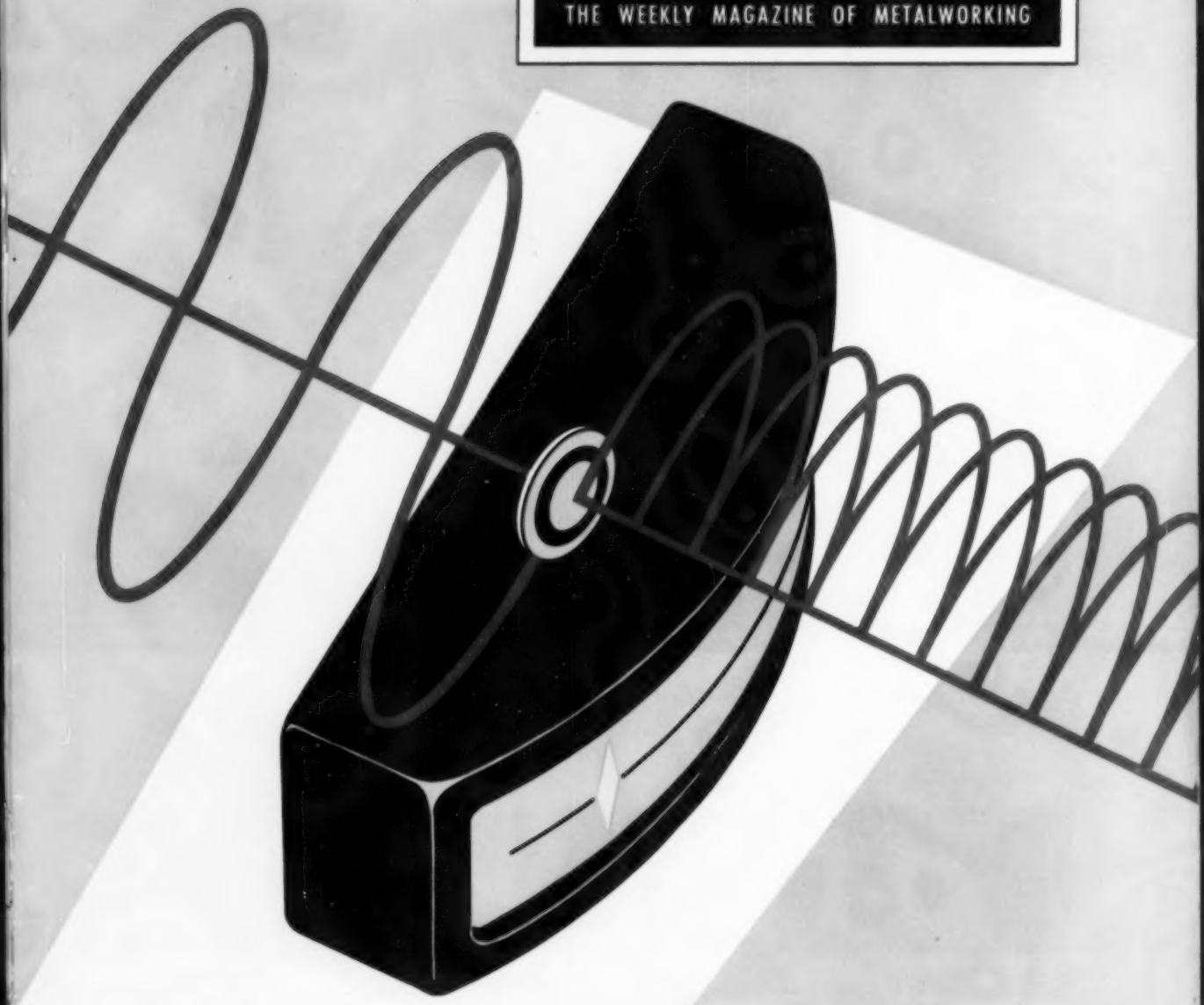
MARCH 21, 1955

STEEL
THE WEEKLY MAGAZINE OF METALWORKING



Revolution in Rectifiers

Germanium and silicon bring higher power conversion efficiency, p. 116

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For faster load discharge... low cost operation... longer life...

EC&M Magnet Controllers have earned a reputation for improved magnet operation. Loads are discharged quickly . . . cleanly . . . without "dribble". Magnets "work more" because faster drops eliminate "positioning" the magnet at point of discharge.

A simple two-position (lift-drop) Master Switch makes operation easy . . . power is off when the master switch is in the drop position. This prevents overheating, keeps lifting capacity high, and substantially adds to magnet life.

For single magnets or two magnets in parallel . . . Type AD STANDARD Controller has exclusive adjustable discharge feature for different type loads. (dial on door).

BOOSTER Controller gives increased pull-away power from pile, then carries load at reduced current.

HIGH SPEED RELEASE DLM-335-A Controller reduces discharge time of deep-type magnets 50%.

EC&M Controllers may be used with all types and makes of magnets.

Write for Bulletin 905

THE ELECTRIC CONTROLLER & MANUFACTURING COMPANY

2698 East 79th Street • Cleveland 4, Ohio

6169

IX

This is the ninth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

The Effect of Nickel in Alloy Steels

Each element in an alloy steel has its own particular job to do, and each is included with a special purpose in mind. What are some of the reasons, say, for using nickel, chromium, molybdenum, vanadium, and other components that appear in the various analyses? The elements in any alloy steel work both individually and as a team. What does each one do? In this and subsequent discussions we shall try to answer these questions, beginning with nickel, one of the fundamental alloying elements.

Nickel increases toughness and resistance to impact, particularly at low temperatures; lessens distortion in quenching; improves corrosion-resistance. It lowers the critical temperatures of steel and widens the temperature range for successful heat-treatment.

Nickel steels are particularly suitable for case-hardened parts, such as aircraft-engine gears and roller bearings. Such steels provide strong, tough, wear-resistant cases and also ductile core properties.

Advantages imparted by nickel are not restricted to quenched-and-tempered steels. Nickel often permits given strength levels to be obtained at considerably lower carbon contents, thereby markedly increasing toughness, plasticity, and fatigue-resistance. Nickel steels are therefore highly suitable for applications where liquid quenching is not employed, such as high-strength structural steels used in the as-rolled condition or heavy forgings not adapted to quenching. Products of this nature must develop superior properties after nothing more severe than air-quenching treatments.

If you would like to know more about nickel steels, or need information about other types of alloy steels, please feel free to consult with Bethlehem's metallurgists. These technicians will gladly advise you regarding analyses, heat-treating, machinability, etc. You are invited to make use of their services whenever you need assistance.

And may we remind you, too, that Bethlehem makes all AISI standard alloy steels, as well as special-analysis steels and the full range of carbon grades. We are always in a position to meet your needs promptly and fully.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

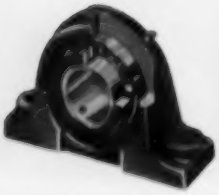
BETHLEHEM STEEL

BETHLEHEM STEEL

thousands and thousands and thousands and thousands

OF SKF

SY UNIT PILLOW BLOCKS GOING INTO SERVICE



SY Unit Pillow Block

FY Flanged Housing

Aligning Bearing Unit

Because they have the most effective bearing seal ever perfected—the famous SKF Red Seal, made of DuPont "Fairprene". Because external rotating flingers exclude dirt . . . Because they are easy to install on standard shafting . . . Because they are interchangeable with existing installations . . . Because they are available promptly from distributors' stocks for shaft diameters ¾" to 2 15/16".

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.— *manufacturers of* **SKF** *and* HESS-BRIGHT® *bearings.*

7010

© 1955 SKF Industries, Inc.

Order from *authorized* SKF distributors anywhere. The red and white SKF box encloses the finest bearings made.

SKF®

BEARINGS AND PILLOW BLOCKS

BSD* Preventive Maintenance Program Cuts Costs—Increases Efficiency for Hooker Electrochemical Company

Unusual expansion of the Hooker Electrochemical Co., Niagara Falls, N. Y., and the resulting demands on its physical plant, required a complete alteration of its preventive maintenance procedures. Expansion of older programs was judged impractical by the Maintenance Procedures Committee and the Remington Rand Systems Consulting Service was asked to analyze existing methods and offer solutions that would increase maintenance efficiency and decrease operating costs at the same time.

Our RECOMMENDATIONS are now part of the company's standard operating procedures. They include: the transfer of Planning and Scheduling responsibilities; the introduction of new Works and Order Estimate Forms to control planning and costs; a new Commodity Classification System which standardizes nomenclature and stock numbering; new Maintenance Project Planning Charts which control day-to-day job progress. Similar methods were developed which appraise machine performance, standardize inspection routines, prevent capital tie-up in obsolete parts, and provide accurate up-to-date cost data. As a result, all levels of management have a complete, accurate maintenance picture for quick fact-founded decisions.

Business Services Department

YOU CAN GET SIMILAR BENEFITS

No single system solves all the preventive maintenance problems for all companies. But, experienced BSD management engineers can create a tailor-made, cost-cutting program for you. The complete Hooker Electrochemical Company story is available to you free.

Circle CH952 in coupon below.

New 10 Drawer Map and Plan Unit Gives You More Usable Drawer Space

Recent studies indicated that in most instances only the bottom 1" of the 2" drawer depth in old style, 5 drawer units could be used conveniently to house flexible tracings. New units have 10, one inch drawers in the same space as the old 5 drawer unit! The new unit matches Remington Rand Aristocrat files in height and depth, giving you more counter work area. Slide-in

door with steel tumbler lock provides safety and convenience.

Each drawer can be partitioned into 2, 4, or 8 sections for housing smaller drawings. Larger index windows permit faster reference. The units can be stacked and bolted together.

Units are designed to be easily inserted into Remington Rand certified, fire-resistive Safe-Cabinets. Circle LBV703 for further information.

Facts for You about Punched-Card Electronics

Here's a folder that shows what punched-card electronics can do for your operation...how all your workaday figurework is cleaned away in a fraction of the present time and cost...how you get more timely, more useful management reports... how you can have far more penetrating business statistics... how you can exploit thousands of facts *from your own files* for greater profits.

Learn about Univac 120 punched-card electronics in FREE folder TM932: *Break through your Cost Barrier.*

Remington Rand

Room 1386, 315 Fourth Ave., New York 10

Please send me literature circled below:

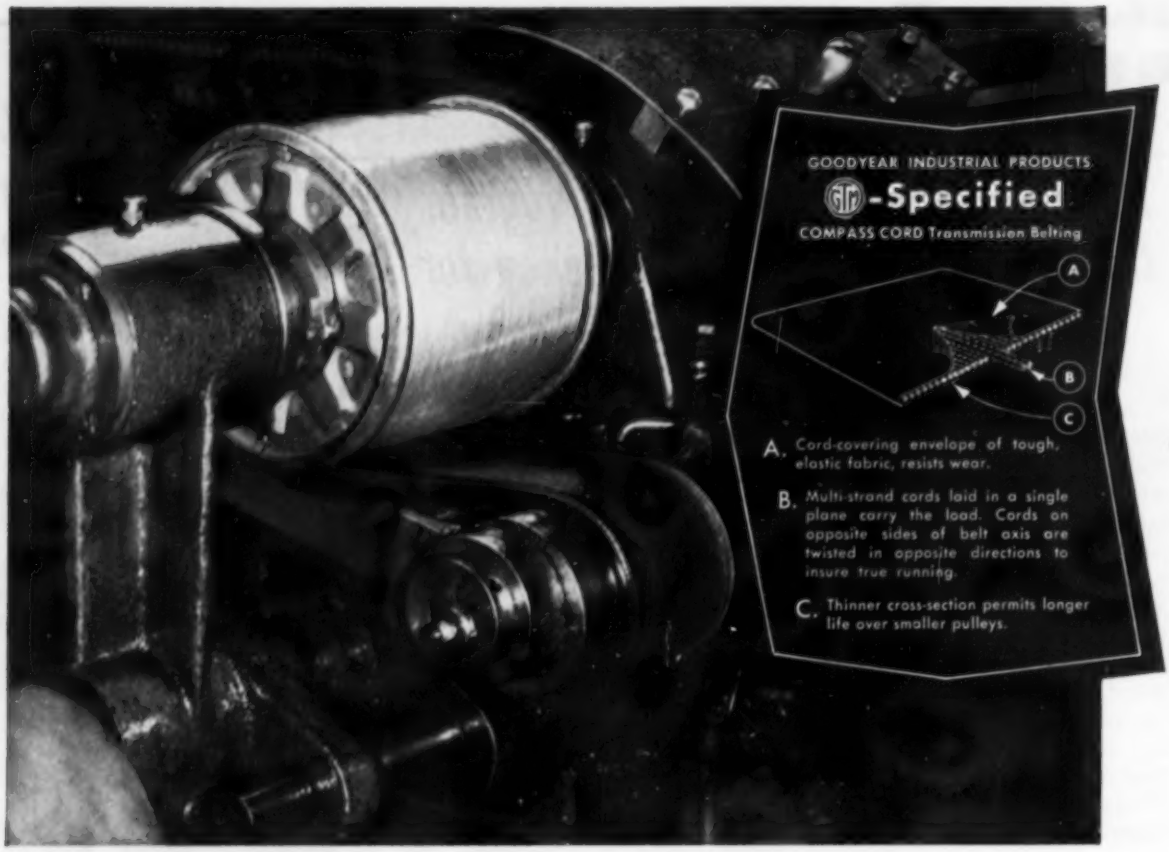
LBV703 CH952 TM932

Name

Company

Address

City Zone State


GOODYEAR INDUSTRIAL PRODUCTS
G-Specified
COMPASS CORD Transmission Belting
A
B
C
A. Cord-covering envelope of tough, elastic fabric, resists wear.
B. Multi-strand cords laid in a single plane carry the load. Cords on opposite sides of belt axis are twisted in opposite directions to insure true running.
C. Thinner cross-section permits longer life over smaller pulleys.

1200% more life

from wire-winding belts

ONCE steel wire is drawn, it must be wound on spools. This is done on special machines with the help of short, endless belts.

Previously used belts lasted only six weeks. Excessive oil, severe abrasion, short centers and high speed were the reasons for such short life. The G.T.M.—Goodyear Technical Man—was consulted. He suggested COMPASS CORD Transmission Belts (see blueprint) with oil-resistant top covers.

RESULT: These endless cord belts *cost less than half* of those formerly used—*last an average of 18 months*—cut down-time and maintenance costs inestimably.

How can the G.T.M. and COMPASS CORD Transmission Belts cut your drive costs? Find out by contacting him, your Goodyear Distributor or writing Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

COMPASS CORD TRANSMISSION BELTS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING
Vol. 136 No. 12 March 21, 1955

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Editorial, Business Staffs—16. Advertising Index—190. Editorial Index available semiannually. STEEL is also indexed by Engineering Index Inc., 29 West 39th St., New York 18.

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what you should know about

METAL PARTS PROCESSING MACHINERY

metalwash CONTINUOUS SPRAY PICKLERS

mail coupon for free booklet:
WHAT YOU SHOULD KNOW ABOUT CONTINUOUS SPRAY PICKLING

metalwash AUTOMATIC PARTS WASHERS

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WHAT YOU SHOULD KNOW ABOUT METAL CLEANING

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PHOSPHATE COATING COMES OF AGE

Metalwash Machinery Corporation
917 North Ave., Elizabeth 4, N. J.
Please send literature checked below:
☐ PICKLING ☐ PHOSPHATIZING
☐ WASHING ☐ FULL-LINE CATALOG

NAME.....
FIRM.....
ADDRESS.....
CITY.....ZONE.....STATE.....

Coming April 18 IN STEEL

Maximize Your Facilities with Better Plant Layout

In the third in STEEL's ten-part Program for Management for 1955, the editors explore metalworking's plant layout problems. During wartime and postwar expansions, many plants grew like Topsy. Layouts were inefficient and inadequate for what's needed in a competitive economy. In preparation for you is a report on how to arrange your equipment more efficiently, improve flow of materials and minimize handling.

behind the scenes

Editor Runs 12th

On the heels of the news that our Detroit Editor Floyd Lawrence competed in the 160-mile Grand National stock car races at Daytona Beach, comes the suggestion that racing stock cars might be required to submit to the saliva test. The editors of *Sports Illustrated* are worried about the ethics of stock car racing; in defense of their concern they point out that drivers who are declared winners one day are disqualified the next, because of the crafty use of nickel-plated hub caps, or tin-lined exhaust pipes, or forced-draft windshield wipers or other strategems calculated to goose the speedometer.

We don't exactly know how Lawrence is connected with this business; he's very clever about automobiles, you know. As STEEL's "Mirrors of Motordom" expert, panel member of a Detroit TV sports automotive show, and President of the Detroit Region Sports Car Club of America, Lawrence is in an excellent position to really make any stock car go, go, go. But does he use his special knowledge to upset the odds by hopping up his engine and rigging his bastard (it almost scares us to use this expression) gear-axle ratios? A ringing "NO!" is the answer. Our boy came in 12th, and that's a pretty good indication that he doesn't barter his know-how for baubles. He writes:

"I drove a 1955 Chrysler New Yorker at the Daytona Beach Grand National in the straightaway competion, and averaged 113.001. I'd have done better, but the floorboard got in the way; besides, I was running on an 8 degrees spark advance, with a barometric pressure of 29.08 on 92.4 octane fuel."

Funny thing about Lawrence: He blames his golf on barometric pressure, too.

Howdy, Texas Girl Scouts

"The eyes of Texas are upon you" is no idle remark, and as far as STEEL is concerned, it also includes the eyes of Texas Girl Scouts. The lovely eyes of Mrs. David Ward, Chairman, Staff and Office Committee, East Texas Girl Scout Council, Inc., of Jacksonville, Texas, turned toward STEEL early this month when a budget problem cropped up over travel expense. Mrs. Ward revealed that she had approached the U. S. Department of Commerce with a request for an estimate on what it cost to run a car per mile, and do you know what the U. S. Department of Commerce told her? It told her to look up the October 11 1954 issue of STEEL, and to consult an article therein entitled "Are you paying too much for auto expense." It so happened that the recreation rooms of the East Texas Girl Scouts were fresh out of STEEL magazines, so Mrs. Ward sent a letter all the way to Cleveland, and we sent tear sheets of the article all the way to Texas. By now the Jacksonville Girl Scouts are tearing all over Texas secure in the knowledge that the budget they have accepted carries the virtual approval of the U. S. Department of Commerce.

Snaps Up Old Snaps

Veteran Steel Plant Editor John Knox went through his files a short while ago and found so many interesting photographs he gave up in despair; he didn't have the heart to destroy them. One old envelope, containing photographs of Ashtabula Harbor dating back as far as 1875, he gave to John Close, Circulation Manager of NEW EQUIPMENT DIGEST, one of STEEL's sister publications. Johnny, the recognized Penton authority on Great Lakes shipping, turned the pictures over to Howard Andrews, Docks and Vessels Dept., the Hanna Co. The Hanna people were delighted to come across the old pictures, particularly views showing some of their old ships, and they happily placed the material in their archives.

"Just after that," said John Close, "J. & L. advertised for old pictures showing their operations, and offered to pay for 'em. I don't know how many were in that Ashtabula envelope, but some time when Jack Knox is out of town, I'm going to go prospecting in his files."

Shrdlu

(Metalworking Outlook—Page 67)

a practical approach to pressroom modernization

Announcing

TWO NEW Verson PLANS

to solve press obsolescence problems

The extensive capital expenditures required to meet competitive pressures have put many manufacturers in an unfortunate position. Modernization is necessary if the manufacturer is to price his product competitively and still make a fair profit. However, the fair profit is necessary before he can afford the modernization. Two new Verson plans make it possible to modernize now and pay for it out of the increased profits it provides. If you are one of the manufacturers faced with the dilemma of needing modernization for better profits, but needing better profits before you can afford modernization, one of these plans may be the answer to your problems.

Customized

INSTALLMENT PROGRAM

For the manufacturer who wishes to own his own presses but minimize his initial capital outlay, Verson offers a Customized Installment Program. It is called "Customized" because the payment plan is tailored to the buyer's own financial requirements rather than to a single fixed plan. Initial payments may be as low as 10 per cent of the purchase price with the balance payable over periods ranging from six months to five years. Further information on a plan to meet your needs will be furnished on request. Please outline your requirements.

Customized

LEASING PROGRAM

For the manufacturer who wants the advantages of modern, efficient presses without capital investment, Verson offers a Customized Leasing Program. Like the Installment Program, a choice of plans is available to best suit the buyer's requirements. In addition to the basic plans, options for continuation, termination and eventual purchase are also available. Special arrangements for special machines will be considered. Further information on a leasing plan to suit your needs will be furnished on request. Please outline your requirements.

A Verson Press for every job from 60 tons up.

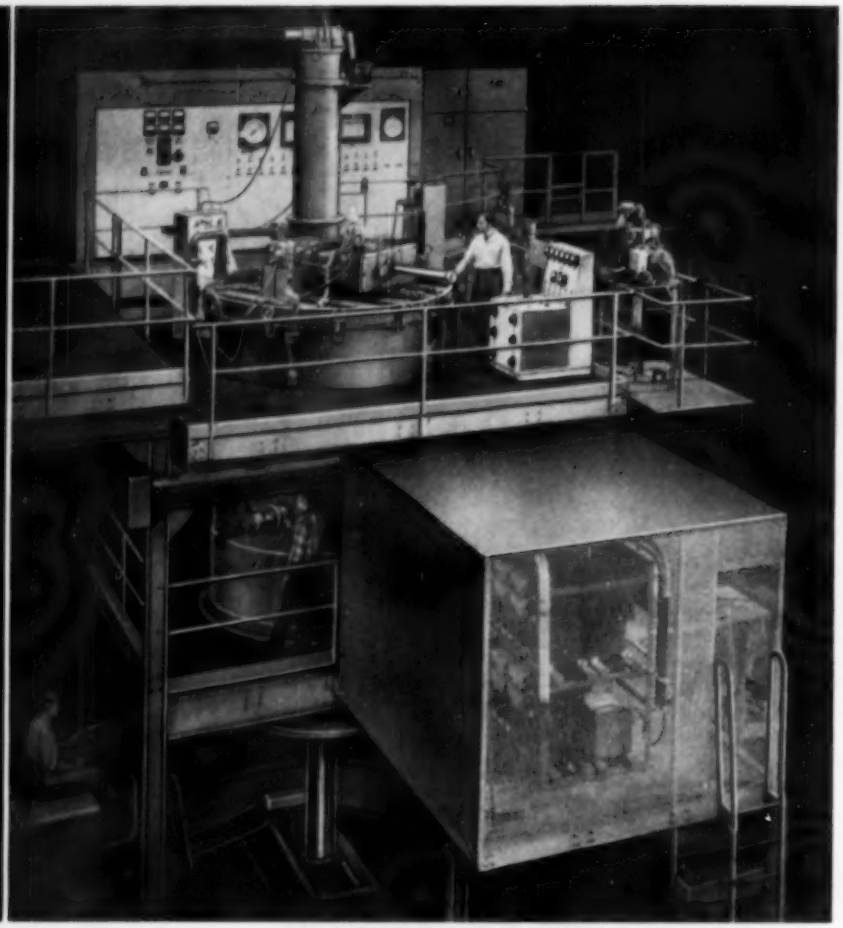
Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9318 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • SO. LAMAR AT LEDBETTER DRIVE, DALLAS, TEXAS

what made vacuum melting work?

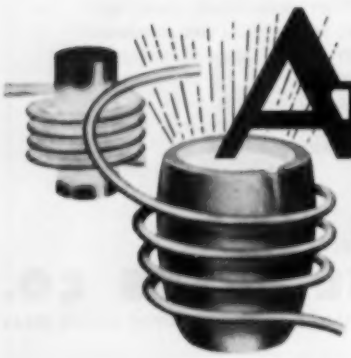


The first 1000-lb. vacuum furnace to be put into production. Photo courtesy Universal-Cyclops Steel Corp., Bridgeville, Pa.

primarily—newly discovered vacuum techniques applied to forty years of induction furnace manufacturing experience. And only at Ajax does this experience cover so many melting developments over such a long period of time. Successful vacuum melting, as it comes from Ajax today, is just another refinement in Ajax quality melting at production speed.

The vacuum furnace illustrated above is typical of a number which are now being built for purer, stronger alloys in capacities from 5 to 2000 lbs. For details, write Ajax Electrothermic Corp., Trenton 5, New Jersey.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP *SINCE 1916*

INDUCTION HEATING-MELTING

New acid-handling system incorporating U. S. Uscolite Pipe saves thousands of dollars a year!

U.S. Uscolite Piping carrying hydrochloric acid from storage tank into plant.

Close-up of Uscolite piping and Hills-McCanna valves outside storage tank. The plant is in the background.

A large Eastern manufacturer of lighting and signaling systems uses 300 feet of Uscolite® plastic pipe to carry hydrochloric acid from storage tanks outside the plant across an areaway, and then through various production departments to final use in the plating room. Previously, carboys of acid had been used, because the plant had no facilities to store acid in bulk. But by installing a new acid-handling system, using U. S. Uscolite piping and fittings, the plant saves thousands of dollars a year—they now *buy and store in bulk*. Additional thousands are saved by reduced handling costs.

The plant also fabricated its own fume hoods from Uscolite sheet stock, for use in the plating operation. The plant engineer is pleased because Uscolite's unusual mechanical strength enables it to be left exposed in any weather, and to be run overhead through various parts of the plant without fear of damage to men or machines. Hills-McCanna Uscolite valves are used in the piping assembly.

Uscolite pipe and fittings are made in the broadest and largest line of stock sizes on the market.

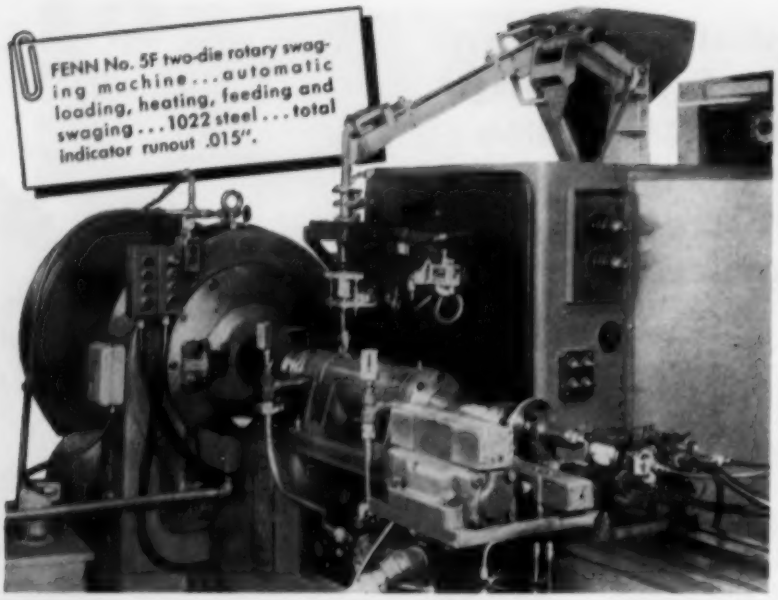
Made by United States Rubber Company, Uscolite is light in weight with high impact strength. It is solving acid and corrosion problems in every industry. The piping can be easily threaded and installed with conventional tools. For replacements or a completely new piping system, get in touch with any of our 27 District Sales Offices, or write to address below.

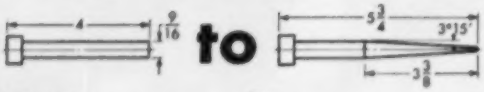
"U.S." Research perfects it..."U.S." Production builds it...U.S. Industry depends on it.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting


FENN No. 5F two-die rotary swaging machine . . . automatic loading, heating, feeding and swaging . . . 1022 steel . . . total indicator runout .015".

Change  to at 500 per hour with full automation

FENN offers to the metal industry . . .

- a completely new and automatic swaging package
- with full automation in loading and feeding
- plus the material and labor savings inherent in swaging.

Now, more industries can profit from hot or cold swaging. Present users of swaging machines can greatly increase their productivity. Or we can design a complete assembly to suit your requirements.

Precision Rolling Mills — Turks Heads — Wire Shaping Mills — Swaging Machines — Accessories.

FENN

The Fenn Manufacturing Company, 552 Fenn Road, Newington, Connecticut

Please send me more information about your Rolling Mills ☐, Swaging Machines ☐, Turks Heads and Wire Shaping Mills ☐.

*Name*_____ *Title*_____

*Company*_____

*City*_____ *Zone*_____ *State*_____

LETTERS
TO THE EDITORS

Prices Will Continue

We note that steel mill prices on fence posts were discontinued in STEEL with the issue of Feb. 7. Have you stopped publishing these prices?

C. F. Heise
Pollak Steel Co.
Cincinnati

• *Normally, fence post prices will be run on alternate weeks. Should changes be effected in the offweek, prices involved will be published then.—ED.*

More Data Wanted

. . . in studying nuclear instrumentation, I have not been able to determine specifically the industry's volume and estimated growth. Will you please advise me of possible availability of such data from your organization?

Howard M. Kirst
Marketing Research Department
Minneapolis-Honeywell Regulator Co.
Minneapolis

• *Information we have available appeared in "Atoms Activate Instrument Industry" (Nov. 15, 1954, p. 96). Possibly you can get additional information from Robert L. Butenhoff, Chief, Radiation Instruments Branch, Atomic Energy Commission, Washington 25, D. C. —ED.*

How To Train Salesmen?

. . . I should be grateful if you could give me some information about training salesmen for the steel trade, which I think demands something quite different from sales of other products. It is rather important in my endeavors to promote the sales of American alloyed and stainless steels in Denmark.

Knud E. Pelch
3, Callisensvej
Copenhagen-Hellerup, Denmark

• *Reprints of "Now Is the Time to Sell" (Feb. 22, 1954, p. 91) and "Rebirth of the Salesman" (Jan. 24, p. 35) have been sent. Also we referred your letter to the American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.—ED.*

Tailored Job

The article, "Water Treatment Is Tailored to the Job" (Nov. 29, p. 68) is of particular interest to us. We would like to reprint it for distribution among our field force.

H. W. McKeever
Infilco Inc.
Tucson, Ariz.

• *Permission granted.—ED.*

Striving for Standards

We are endeavoring to set up standards for rough casting tolerances that may be used by our product design, methods, tool and inspection departments. Are you familiar with any pub-

(Please turn to page 12)

New multi-purpose 10 lb. Ansul Extinguisher

can simplify your fire protection problem

Easy-to-operate Ansul 10-pounder gives fast, effective results. Light weight makes it easy for women to use.

The 10-pounder stands up under rugged road use. Built to give dependable service after extreme exposure. Listed by Underwriters' Laboratories.

New rugged unit gives you high fire killing rating, light weight, modern design

The new Ansul 10-pounder is *designed* and *constructed* for all-around plant use—wherever dry chemical protection of this capacity is called for. It is ideally suited for truck protection, other outdoor hazards and indoor use. This multi-purpose advantage means that you have fewer models of extinguishers to service and a less complicated training program to maintain.

The high fire killing rating (B1, C1) of this unit gives you *effective* protection the *instant* it's needed. Another advantage of the Ansul 10-pounder is its light weight. This feature is important where women are called upon to lift and operate the unit. This extinguisher is also modern in appearance. It was styled by Raymond Loewy to be *seen* in any location—in the office, laboratory, plant, or on a truck.

Have the Ansul Man review your class B and C hazards, those involving flammable liquids, gases, and electricity. He will show you how the Ansul 10-pounder can make your fire protection program easier to administer, more economical to maintain.

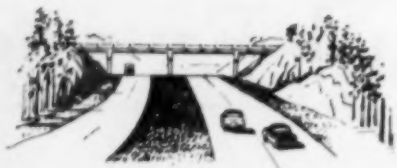
Call the Ansul Man!

Get in touch with your local Ansul man through the "yellow pages" or write ANSUL CHEMICAL COMPANY, Fire Equipment Division, Dept. F-135, Marinette, Wisconsin. *Write Ansul for your copy of new Fire Equipment Catalog.*

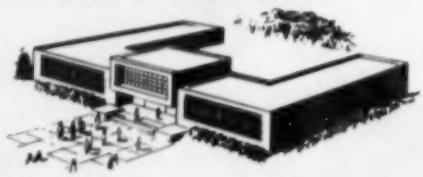
ANSUL

A favorable "tax package"

with economies through State level administration



GOOD ROADS



MODERN SCHOOLS

—is one of the many advantages of plant locations in progressive

NORTH CAROLINA

A "tax package" that is one of the most favorable in the Nation for a typical plant is provided by North Carolina, along with its many other advantages—such as abundant labor, accessibility to markets, mild Mid-South climate.

A true picture of this is obtained by considering the *combination* of State and local taxes.

North Carolina's business-like government supports good roads and progressive schools at the State level, including these vital services in the State tax schedule for stability and money-saving operation.

Local taxes, relieved of the costs of roads and schools, are *low*, yet sufficient to properly take care of local-level services.

The actual "tax package"—State and local combined—compares very favorably with any.

Testimony to satisfaction with this uniquely stable tax program and the high productivity of available labor is provided by the roster of well-known companies which have selected North Carolina for *additional* plants and expansions.

A copy of the "Summary of State and Local Taxes Payable by a Manufacturing Corporation in North Carolina" will be sent promptly upon request. Just write, wire or phone Ben E. Douglas, Director, Department of Conservation and Development, Raleigh 10, N. C.

A handy brochure, covering many plant-location factors, is ready to mail—write for a copy.

Friendly North Carolina Where Industry Prospers

LETTERS

(Concluded from page 10)

lished data which your group or any other group has compiled as a standard of quality which may be used by industrial concerns?

J. F. Barnes
Schutte & Koerting Co.
Cornwells Heights, Pa.

• *Generally, standards are set by agreement between the buyer of the castings and the foundry that makes them. To our knowledge, the only organization that has set up standards for castings—and these are for steel castings—is the Steel Founders' Society of America, 920 Midland Bldg., Cleveland, O.—ED.*

Beneficial Reading

Please send me any available reprints of STEEL's 1954 Program for Management series. Several of these articles already have been beneficial in my preparation of papers for graduate study in business administration.

Joseph J. Scavullo
1711 61st Ave.
Cheverly, Md.

• *Sent.—ED.*

Promoting Products

I think your article, "Product Communication Paves Way for Greater Sales" (Feb. 14, p. 73), is a dandy. In fact, just last night I was giving an informal talk to members of other departments, and I based it on the product communications theme—*who* we are, *what* we make, our *reputation*. Can you please send me 20 reprints that I can personally deliver to key members in our company?

John P. Osterman
Ajax Electric Co.
Philadelphia

. . . found it quite helpful to me in the realm of product promotion manager. I would like about 25 reprints for distribution to our sales personnel.

Nevin J. Rodes
product promotion manager
Conveyor Division
Jeffrey Mfg. Co.
Columbus, O.

Please send me five copies each of "Rebirth of the Salesman" (Jan. 24, p. 35) and "Product Communication." The latter article is strong and indeed timely.

Thos. J. Skok
service engineer
Speer Carbon Co.
St. Marys, Pa.

• *Sent.—ED.*

Blast Furnace Kudos

We have been following with interest the recent four-part article "Burdening the Blast Furnace" (Feb. 7, p. 116; Feb. 14, p. 92; Feb. 21, p. 82; Feb. 28, p. 96). We would appreciate three complete copies.

K. E. Krauss
Blocked Iron Corp.
Albany, N. Y.

. . . I enjoyed the recent articles. Will you send me two sets?

Jay W. Irvin
Kaiser Engineers
Oakland, Calif.

• *Sent. Limited quantities are still available—ED.*

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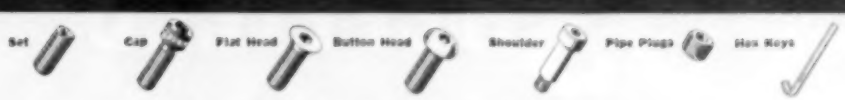

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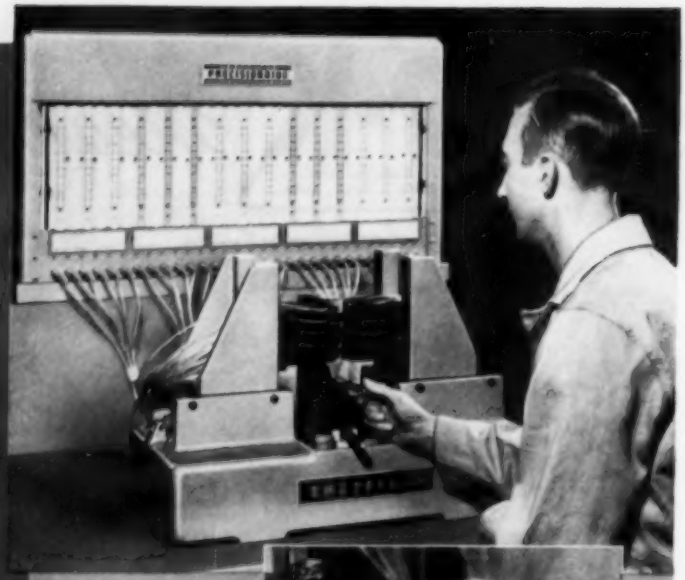
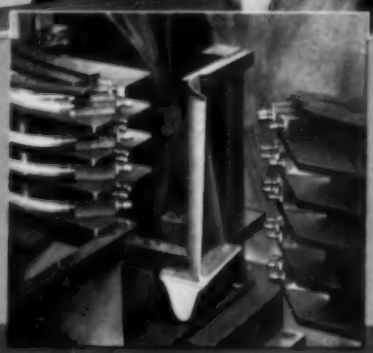


Checking 30 points on a jet engine blade



Gaging heads ready to approach the jet engine blade

Spectacular developments in AIR gaging are saving industry millions of dollars and thousands of man-hours. Here's how and why:

1. One operator with one gage can check up to 40 or more dimensions of each work part simultaneously and instantly. The number of parts per hour depends solely on how fast the inspector can handle them.

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3. The position of each float shows just where the dimension is within tolerance limits or just how much above or below limit if it is out of tolerance. This is essential for Quality Control.

PHONE, WIRE or WRITE for the full story on how YOU can "produce more and better products at lower cost through practical precision"—in this case, multiple dimension inspection by Precisionaire gaging.

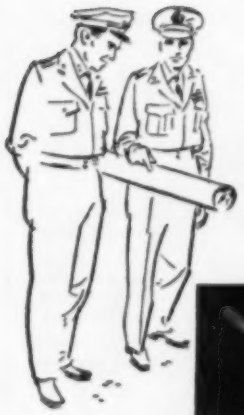
Gage Division — The Sheffield Corporation
Dayton 1, Ohio, U. S. A.

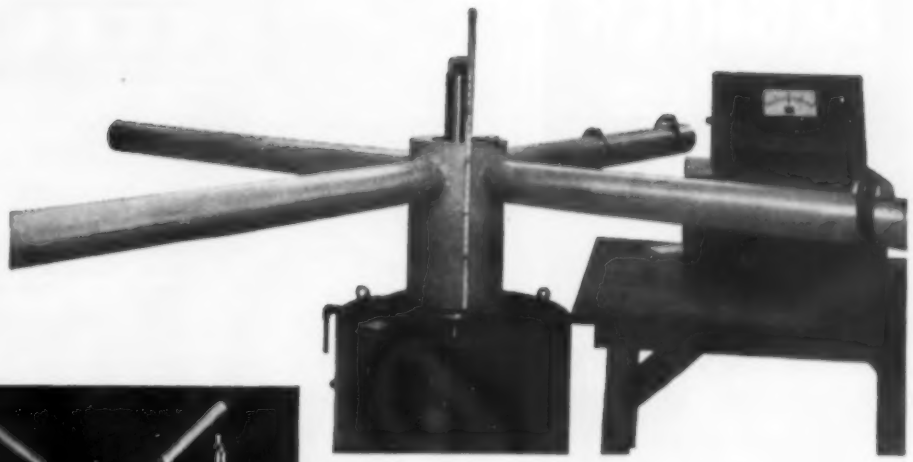
All main bearings of a tractor crankshaft are checked simultaneously

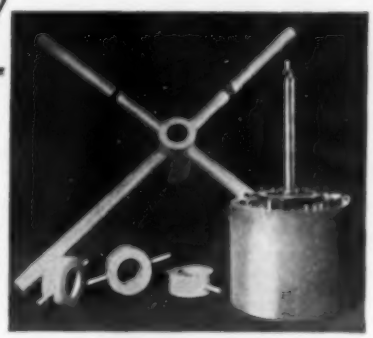
6757

MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

SHEFFIELD







Courtesy:
Guaranteed Welding
Engineering Co.,
Clifton, N. J.

Test deadline met... Costs cut...

with a FRASSE tubing "special"

With new turbo propellors already in production, a 3000 pound "dummy" prop was needed quickly to test a new electronic balancing device for the armed forces. In spite of a near impossible one week test deadline, the maker delivered the simulated prop *3 days early*–yet *cut costs 30%**.

The hub, too large and heavy for standard tubing, was first planned as a forging machined to size. But delivery quoted was six weeks–and machining costs were high.

Frasse supplied a centrifugally spun steel tube *12½" O.D. x 2¾" Wall*–a Frasse tubing "special"–right from warehouse stock. The large diameter heavy wall tube eliminated costly machining–sped the job to completion in 4 days!

Tubing "specials" like the one used here are a stock feature at Frasse. Complete and diversified stocks, prompt deliveries and assistance in tubing selection and fabrication "know-how" add up to Frasse–*the tubing warehouse.* For carbon, alloy and stainless steel tubing make your *buy*-word Frasse.

*Cost figures available on request

FRASSE for *everything in* **Steel Tubing**

Want details on ALL Frasse tubing?

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How metalworking plants

Save time...cut costs with

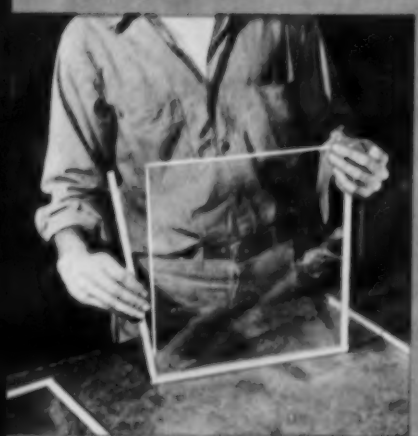
SCOTCH BRAND *Pressure-Sensitive Tapes*

45 ACTUAL EXAMPLES showing how production is increased . . . costs are cut . . . products are improved with "SCOTCH" Brand Pressure-Sensitive Tapes.

PRODUCT ASSEMBLY
is simplified with Pressure-Sensitive TAPES

You can get "SCOTCH" Brand Pressure-Sensitive Tapes made of foil or cloth, as strong as steel, as flexible as fine paper, waterproof, acid resistant, even sticky on both sides. In other words, whatever your problem in assembling a product, there is a tape to do it faster, cheaper, cleaner, better!

14 **HOLD** decorative cloth coverings on consumer equipment with "SCOTCH" Brand Double-Coated Tape No. 400 applied to edges and corners of the wood or metal frame. Tape sticks at a touch; is clean and easy to handle; assures a long-lasting bond with outstanding application economy.



15 **PROTECT** glass panels with "SCOTCH" Brand Plastic Tape No. 471. Top: Metal channels fitted to taped glass edges. Bottom: Vibration-proofed assembly is inserted into case.

16 **POSITION** small parts temporarily with "SCOTCH" Brand Masking Tape No. 202. Above, vibration shims are taped to automobile frames to hold them until body is bolted down. Tape is economical; easy to apply; easy to dispose of.

17 **SPEED** assembling with "SCOTCH" Double-Coated Tape No. 666 and M-71 Dispenser.

18 **TWO JOBS** are often handled by "SCOTCH" Double-Coated Tape. At right, tape holds halves of part; left, same strip temporarily positions graphite blocks.

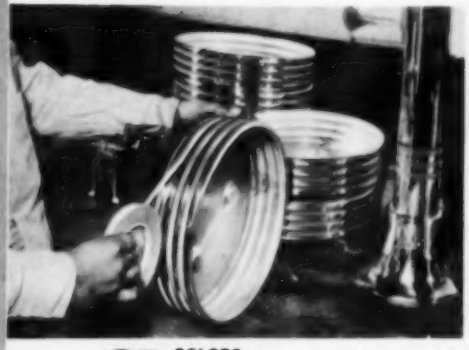
19 **DECORATE** products with "SCOTCH" Brand Metalized Polyester Tape No. 850. Withstands extreme temperatures and exposure; will not tarnish.

There are more than 300 PRESSURE-SENSITIVE TA

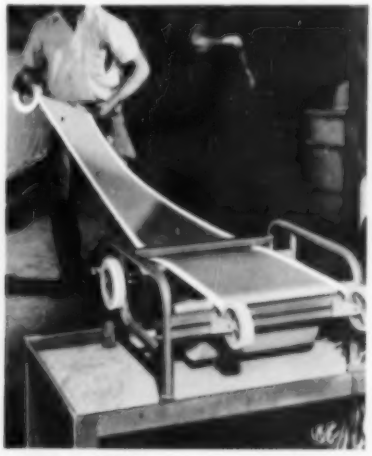
PAINTING is neater, cleaner, quicker with TAPE!

The variety of "SCOTCH" Brand Masking Tapes is constantly being expanded to meet new needs of industry as fast as they arise. Advancements in dispensing tape make it possible to do many jobs automatically. All in all, "SCOTCH" Brand Masking Tapes can save time and money wherever painting is done in your plant.

20 **SELECTIVE** masking of auto bodies for multi-tone painting is easily accomplished with "SCOTCH" Brand Masking Tapes. Tapes stick at a touch; hold firmly to prevent paint "bleeding" or "creep-under"; withstand drying temperatures up to 280° for extended periods; strip off easily; leave no adhesive residue.



21 **COLORS** that roll on dry! Fountain stools are trimmed with economical, long-life, **red** "SCOTCH" Brand Acetate Fibre Tape No. 700.



22 **SPEED** large-area masking with "SCOTCH" Brand Apron Taper. Dispenses paper strip with masking tape already applied to edge.

23 **SAVE** time and materials on intricate masking jobs with pre-cut pieces of "SCOTCH" Brand Masking Tape. May be cut on the job.

24 **FOR HIGH-HEAT** bake-oven applications, use "SCOTCH" Brand High-Heat Masking Tapes. Withstand temperatures to 375° F.

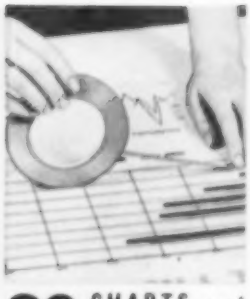
25 **FLEXIBLE** creped backing of "SCOTCH" Brand Masking Tape. No. 202 takes curves and irregular surfaces easily.

OFFICES too need good TAPE "TOOLS"!

"SCOTCH" Brand Tapes can protect and preserve records, blueprints, documents; provide colors for charts; hold, seal, bind; securely seal envelopes and cartons in a matter of seconds.

26 **SEAL** envelopes, boxes, packages neatly and securely with "SCOTCH" Carton Sealing Tape No. 260. Easy-to-apply tape sticks at a touch; is tough, weather-resistant and long aging.

27 **ANCHOR** riders, attachments, etc. to original documents with "SCOTCH" Brand Cellophane Tape. Crystal-clear tape does not obscure printing; holds pieces securely together.



28 **CHARTS** and graphs are easy to make with "SCOTCH" Brand Tapes in **colors.** 12 brilliant colors roll on dry . . . stick at a touch . . . no smearing or clean-up time.

VE TAPES for industry trademarked SCOTCH BRAND . . . . . .

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How metalworking plants

Save time...cut costs with

SCOTCH Pressure-Sensitive Tapes

Reg. U.S. Pat. Off.
BRAND

45 ACTUAL EXAMPLES showing how production is increased . . . costs are cut . . . products are improved with "SCOTCH" Brand Pressure-Sensitive Tapes.

STAMPING and FABRICATING can profitably use these TAPE "Tools"

Polished surfaces often need protection through stamping, blanking, or fabricating. "SCOTCH" Brand Tapes can protect three ways: 1. By covering the entire area; 2. by lining female dies; 3. by holding protective masking material in place. Regardless of which method you use, tape can protect your products against marring and scratching in production.

7 **PROTECT** aluminum strips during drilling and boring operations with "SCOTCH" Brand Masking Tape No. 250. Above applicator was custom designed by "3M" to apply tape to strips automatically at production speeds.

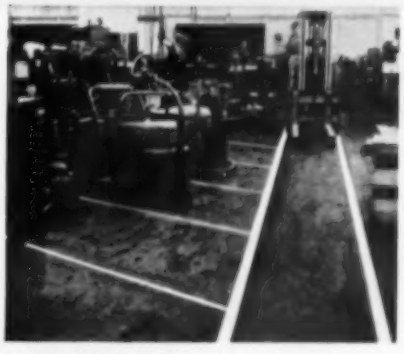
8 **HOLD** components temporarily together during stamping operations with "SCOTCH" Brand Masking Tape No. 216. Tape adhesive will not transfer; strips off clean after final assembly.

9 **SPEED** application of coverings with "SCOTCH" Masking Tape, paper, and "SCOTCH" Apron Taper. Tape is automatically applied to one or both edges of paper as it is unrolled.

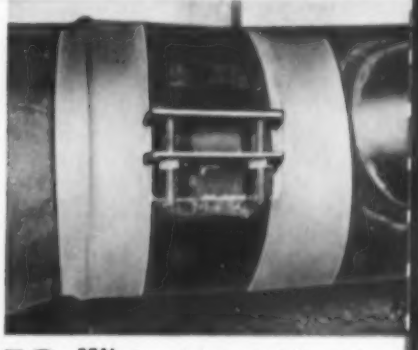
10 **REDUCE** damage to polished surfaces by masking with "SCOTCH" Brand Tape No. 202 and paper. Faster stamping, too; no special precautions for scratches or stains needed.

11 **CUT** number of rejects caused in processing aluminum by protecting with "SCOTCH" Masking Tape No. 250. Tape resists scratching and abrasion; strips off clean.

Easy answers to plant MAINTENANCE problems



12 **MARK LANES** for traffic; define storage areas with "SCOTCH" Plastic Tape No. 471. Tape sticks to any clean, dry surface; resists acids, alkalies, oils, and solvents. Eight colors.



13 **SEAL** duct joints air-tight with "SCOTCH" Brand Plastic Tape No. 474. Tough, stretchy tape conforms easily to irregular or curved surfaces; is unaffected by heat, moisture.

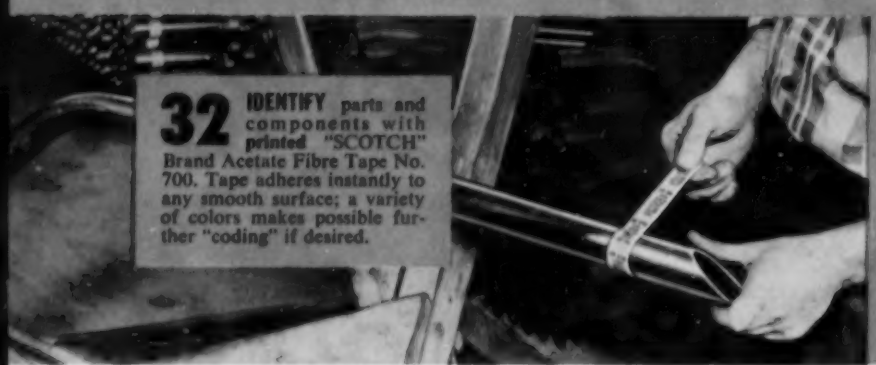
for industry trademarked SCOTCH BRAND

PROMOTE PRODUCTS with TAPES that sell as they hold

29 Versatile "SCOTCH" Brand Pressure-Sensitive Tapes contribute greatly to the sale and merchandising of metalworking products. The wide range of colors; the variety of backings; plus instant-grabbing adhesives make "SCOTCH" Brand Tapes ideal for product labeling, holding, sealing, and banding. "SCOTCH" Brand Tapes help you gain greater customer recognition and acceptance for your products!

30 **TEAR STRIP CONTAINERS** open Z-I-P . . . with a pull of tape — "SCOTCH" Brand Filament Tape. No knives . . . no damaged product!

31 **SANDWICH** screws, bolts, etc. between paper and strip of "SCOTCH" Brand Tape No. 216. Correct number of screws is easily packaged with product.



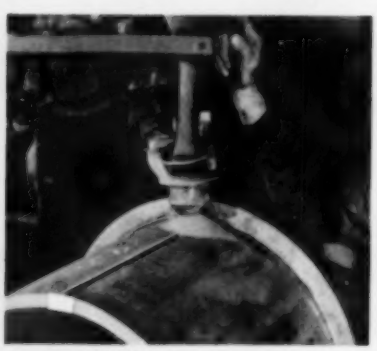
32 **IDENTIFY** parts and components with printed "SCOTCH" Brand Acetate Fibre Tape No. 700. Tape adheres instantly to any smooth surface; a variety of colors makes possible further "coding" if desired.

33 **PRINTED** tapes do many selling jobs: Top, Acetate Fibre Tape secures lid, promotes brand name; bottom, printed "SCOTCH" Brand Cellophane Tape ruler decorates tackle box.

WELDING is faster, easier with TAPE as a tool!

"SCOTCH" Brand Glass Cloth Tape No. 365 literally "pays for itself and shows a profit" in time savings when used on submerged arc welding operations:

34 **TAPE** is quickly applied on butt, double V, and fillet welds to prevent burn-outs on partial penetrations. Tape sticks at a touch.

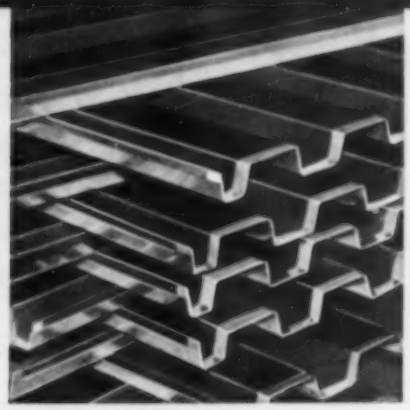


35 **WHEN** "SCOTCH" Brand Tape No. 365 is used as a replacement for stringer bead and other back-up materials, clean-up time is cut 75%.

. For further information on any tape applications,

PACKAGING and SHIPPING . . . expedite with TAPES

"SCOTCH" Brand Pressure-Sensitive Tapes provide an answer to almost every packaging and materials handling operation: holding, sealing, banding, reinforcing, bundling, palletizing, and securing. What's more, nearly all these operations can be performed with automatic or semi-automatic tape applying equipment to make packaging a production-line operation.

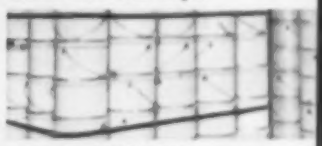


36 **PROTECT** polished metals during stamping, shipping, storage (one tape does all!) by covering with "SCOTCH" Brand Tape No. 344.

37 **TAB** metal coil ends on spool with "SCOTCH" Brand Masking Tape. Tape holds firmly; will not scratch or mar surface.

38 **STAIN-RESISTANT** . . . "SCOTCH" Brand Tape No. 885 can be used to bundle painted metal pieces for shipment without fear of binding, scratching, staining, or paint removal.

41 **FASTEN** coverings on porcelain, enamel, or stainless steel; secure doors, drawers, with "SCOTCH" Brand Filament Tape.



39 **BUNDLE** metal pipe, tubing, rods, bars, with "SCOTCH" Brand Filament Tape. Tape has up to 500 lbs. tensile strength per inch of tape width; exclusive "mirror-surface" adhesive puts it all to work.

40 **AUTOMATIC** equipment wraps three pipe or bar stock bundles a minute with "SCOTCH" Filament Tape.

42 **PALLETIZE** drums, cartons, etc. to prevent shifting or sliding with layer wraps of "SCOTCH" Brand Filament Tape.

43 **SHORT STRIPS** of "SCOTCH" Brand Filament Tape reinforce cartons. Same tape that holds cartons closed, strengthens score lines.

44 **BULKY** bundles can be easily wrapped with "SCOTCH" Brand Filament Tape. Above: Automatic air-operated dispensers deliver pre-determined lengths of tape as automobile bumper is lowered into wrapping cradle. Workers simply pick tape from dispenser. Quick, easy wrapping at production line speeds.

tions, use inquiry form on last page

You name it...
We'll **TAPE** *it...*

- ✔ *Manually*
- ✔ *Semi-Automatically*
- ✔ *Fully Automatically!*

45 Nearly every tape applying operation can be performed better, faster and cheaper with a dispenser designed for the job. There are now more than 75 different types of manual, automatic, and semi-automatic dispensers available for "SCOTCH" Brand Tapes. And these basic types of machines lend themselves to an infinite variety of adaptations. Chances are, whatever your taping problems, our Customer Service Department already has a dispenser answer. If not, they'll be glad to work one out for you without cost or obligation.

Get "Scotch" Brand Pressure-Sensitive Tapes from your regular distributor or use this inquiry form for complete information

NEW INQUIRY
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INFORMATION!

MINNESOTA MINING AND MFG. CO.
St. Paul 6, Minnesota

Please send me complete information on the metalworking tapes and applications checked:

TAPES: ☐ CELLOPHANE ☐ PLASTIC ☐ FILAMENT ☐ DOUBLE-COATED ☐ ACETATE FIBRE ☐ MASKING

☐ 1 METALIZING	☐ 12 LANE MARKING	☐ 23 PRE-CUT MASKS	☐ 34 WELDING
☐ 2 WELD SMOOTHING	☐ 13 SEALING DUCTS	☐ 24 HIGH-HEAT MASKING	☐ 35 GLASS CLOTH
☐ 3 MILLING	☐ 14 CLOTH COVERINGS	☐ 25 PROTECTIVE MASKING	☐ 36 PROTECT METAL
☐ 4 POSITIONING	☐ 15 GLASS CUSHIONING	☐ 26 SEALING	☐ 37 METAL COILS
☐ 5 SMALL PARTS	☐ 16 TEMPORARY HOLDING	☐ 27 ANCHORING	☐ 38 STAIN RESISTANT
☐ 6 ELECTROPLATING	☐ 17 ASSEMBLING	☐ 28 CHARTS	☐ 39 BUNDLING
☐ 7 ALUMINUM	☐ 18 TWO-JOB TAPE	☐ 29 PROMOTION	☐ 40 AUTOMATIC
☐ 8 STAMPING	☐ 19 DECORATING	☐ 30 TEAR STRIP	☐ 41 COVERS
☐ 9 COVERINGS	☐ 20 SELECTIVE MASKING	☐ 31 SCREWS	☐ 42 PALLETIZING
☐ 10 STAMP MASKING	☐ 21 DRY COLORS	☐ 32 IDENTIFICATION	☐ 43 REINFORCING
☐ 11 SCRATCH PROTECTION	☐ 22 APRON TAPER	☐ 33 PRINTED TAPES	☐ 44 BULKY PACKAGES

☐ 45 DISPENSERS OTHER .....

There are more than... **300** PRESSURE-SENSITIVE TAPES for industry, trademarked...

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SCOTCH BRAND

NAME ..... TITLE .....

COMPANY ..... ADDRESS .....

CITY ..... ZONE .....

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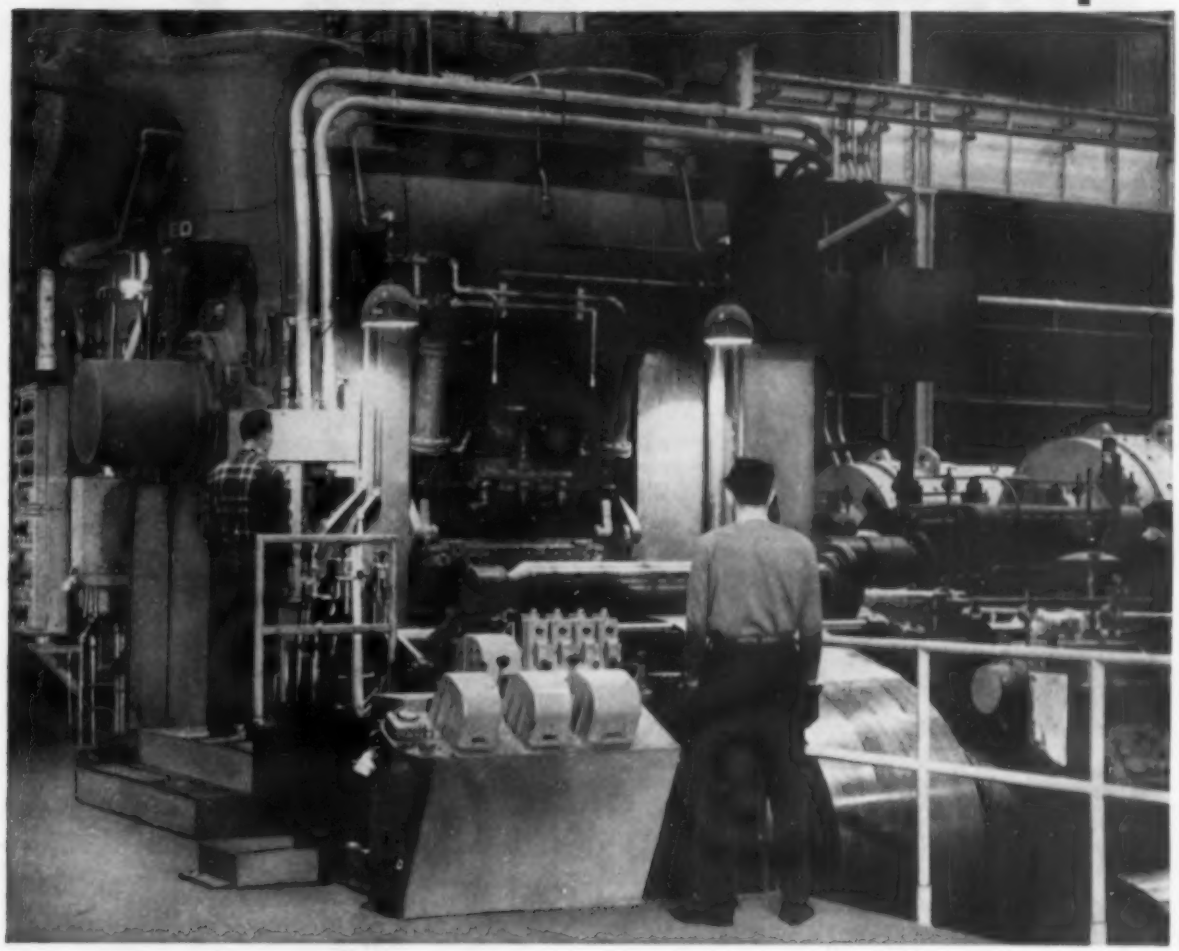
The term "SCOTCH" and the plaid design are registered trademarks for the more than 300 pressure-sensitive tapes

MADE IN U.S.A. BY
MINNESOTA MINING AND MANUFACTURING COMPANY
ST. PAUL 6, MINNESOTA

General Export: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

You'll like our service and the quality of our cold rolled sheets and strip



Cold reduction mill at our Indiana Harbor Works, now completing its first year of full-scale operation.

Customers like the uniform high quality of our cold rolled sheets and strip. They find that with Youngstown they have few rejects, low fabrication costs.

Youngstown cold rolled sheets and strip are held to rigid, high standards of ductility, tensile strength and other forming characteristics that mean money in your pocket.

Let us schedule your requirements NOW. Whether you need a carload a week or a few coils per month, you'll like our service and quality.

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Youngstown

COLD ROLLED SHEETS AND STRIP

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

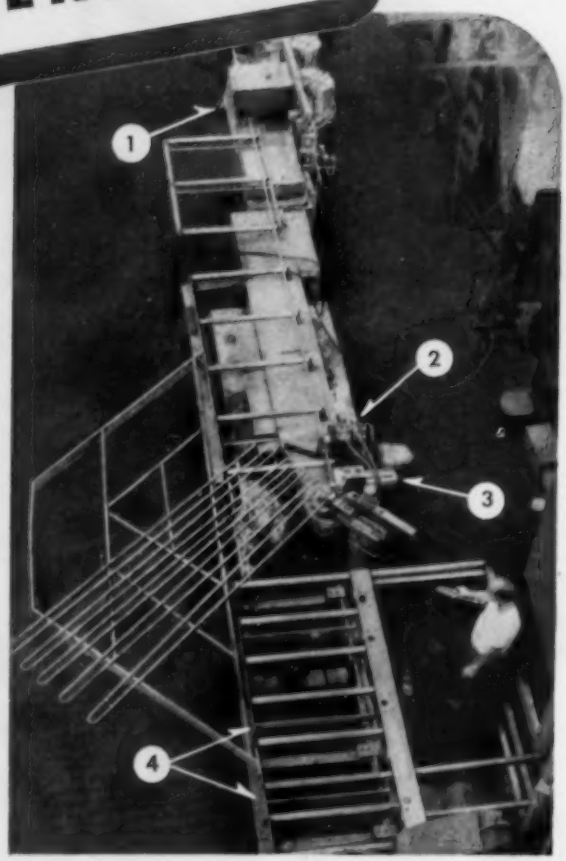
Automation IN COIL BENDING

How Serpentine Coils Are Now Produced in One Continuous Operation on PINES Size 1¼ Production Bender

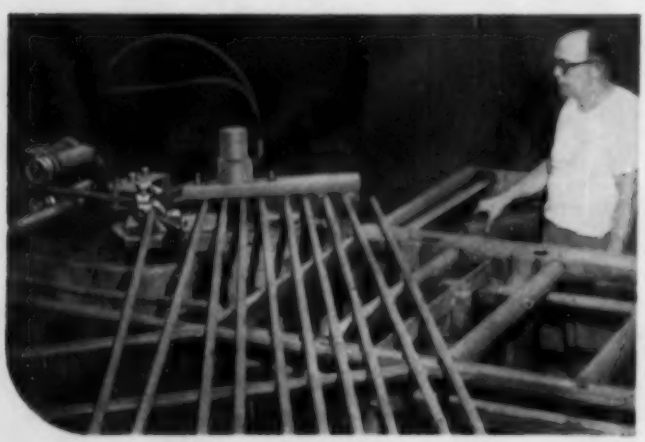
● At Carrier Corporation, Syracuse, N. Y., large serpentine air conditioning coils are now completely formed in one, continuous bending operation on a Pines Size 1¼ Production Bender equipped with a flash welder, automatic feed roll, and turn-over fixture. By former methods, three machines were required to meet production needs, and after bending, from 64 to 128 welds were necessary to fabricate a complete cooling unit. In addition to the slow, inconvenient welding procedure, a considerable amount of stock cutting and work handling was required.

COILS NOW PRODUCED AT 200 BENDS PER HOUR

Today, with the new Pines equipment, complete serpentine coils are now formed with little work handling. Straight lengths of stock are butt-welded together before bending which permits completing the coils in one, continuous operation. This method reduces the number of welds and stock cutting because long lengths of stock are used. Scrap losses are reduced as much as 80%, and since the entire operation is mechanized, work handling is substantially reduced. The result — complete coils are now produced on one machine with two operators at a production rate of 200 bends per hour.



▲ Over-all view of Pines installation at Carrier Corp., Syracuse. Handles standard pipe ranging from ⅜" up to 1¼" sizes. The unit combines (1) welder, (2) feed roll, (3) bender, and (4) turn-over fixture.



◀ Closeup view showing automatic feed roll and tooling. Hinged clamp die with angular cam surface and mating plate permits clamping workpiece without interfering with formed coil. Long, horizontal clamp holds ends of coils to prevent distortion during sweep of bending arm.

WRITE FOR *Free* DATA SHEETS

For more information on latest developments in production bending, write for copies of "Pines News". Describes and illustrates how production bending is helping cut manufacturing costs on a wide variety of jobs.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery · 652 WALNUT · AURORA, ILLINOIS

PRODUCTION BENDING · DEBURRING · CHAMFERING MACHINERY

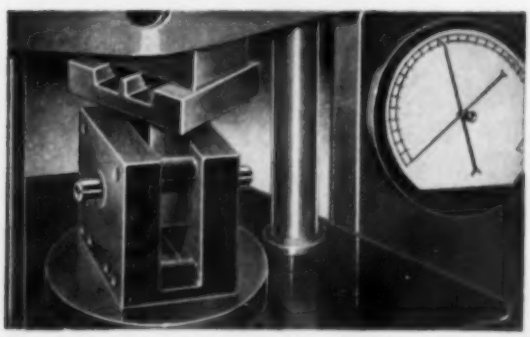
consistent strength... as important in the pin as in the socket

Normal leverage puts the load on the pins at these points. Pins must have a high resistance to shearing — and every pin must stand up to plenty of abuse. Many manufacturers' tests have proved Rollpin's uniformly high shear strength.

The Moore Drop Forging Company, who manufactures the famous Craftsman wrenches for Sears Roebuck and Co., used stainless steel rivets to fasten the universal joint on their Flex sockets. Thorough testing, under all possible load conditions and drive angles, convinced them that Rollpin was stronger than the stainless steel rivet previously used. This led to a redesign of the joint with Rollpins replacing the rivets. Also, the spring tension inherent in the Rollpin locking principle was used to provide the "drag" that holds the socket head in angular position. The result . . . an improved product at lower cost.

Dependability like this is based on the rigid ESNA® quality controls that insure consistent strength and mean reliable performance by every Rollpin.

Moore Drop Forging Company was able to save assembly time, too. Rollpin is simply driven into holes drilled to normal production tolerances. It compresses as driven, locking itself in place by exerting pressure on the hole walls. In this case, the extra operation of spinning on a rivet head was eliminated.



We urge you to test spring pins before you buy — for uniformity of diameter and length, hardness, insertion and removal forces, and recovery of diameter, as well as shear strength.

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. 829-360, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

- ☐ Rollpin samples
- ☐ Rollpin bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

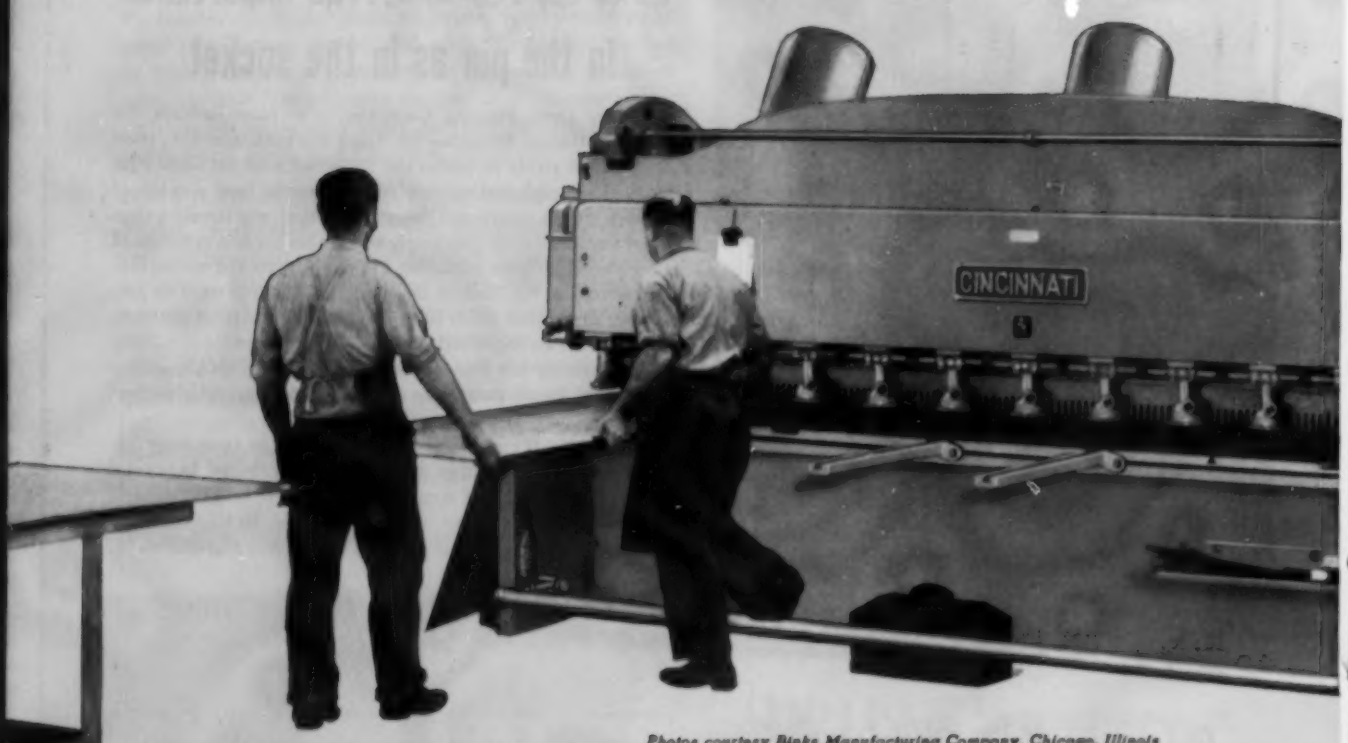
Street _____

City _____ Zone _____ State _____

accurate CINCINNATI

shearing from 20 GAUGE SHEETS to 5/16" PLATE ...with ONE knife setting

...SPEEDS PRODUCTION



Photos courtesy Binks Manufacturing Company, Chicago, Illinois

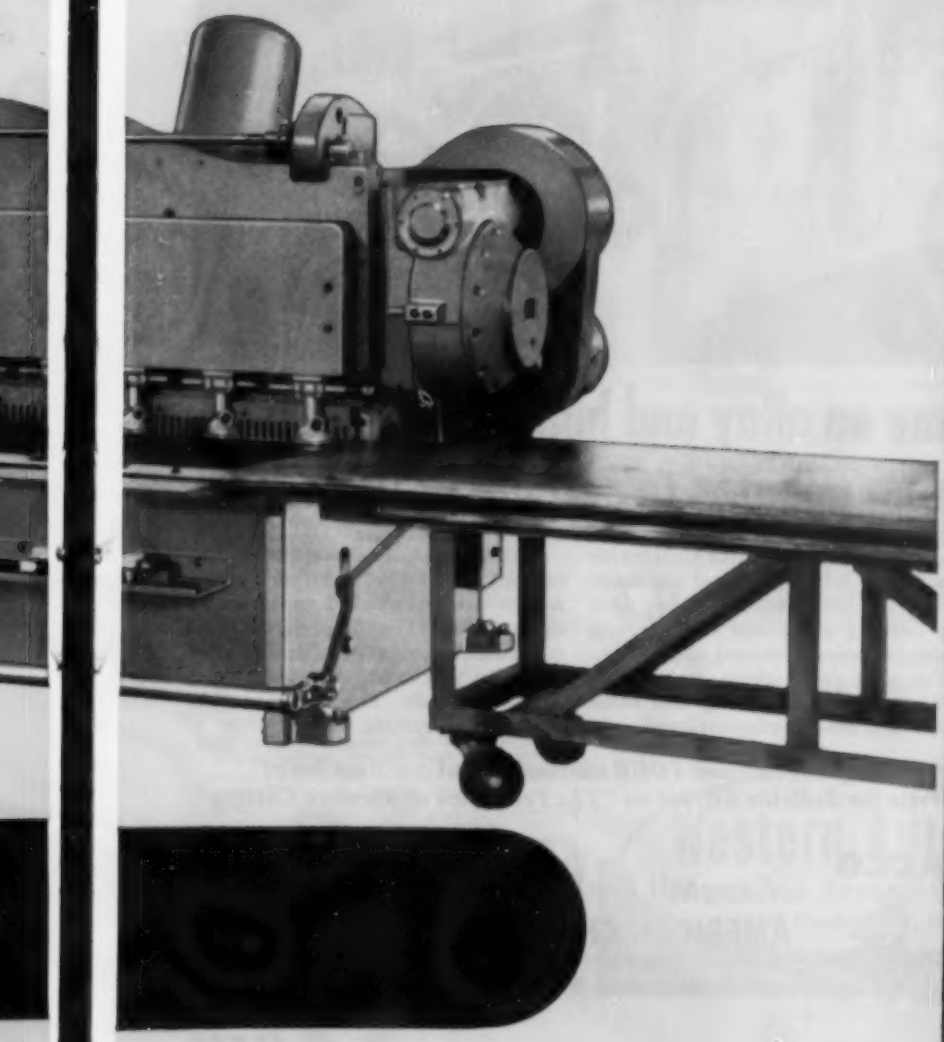
THE CINCINNATI SHAPER CO.

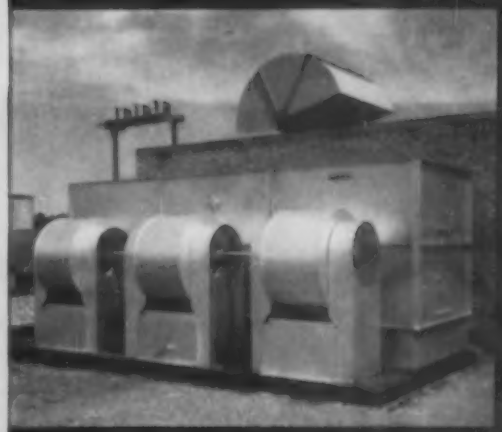
CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Here 20 gauge to $\frac{1}{4}$" plate is sheared with no change of knife clearance—a time saving and production increasing feature.

The Binks Manufacturing Company say this Cincinnati Shear is a very accurate machine and a most profitable investment.

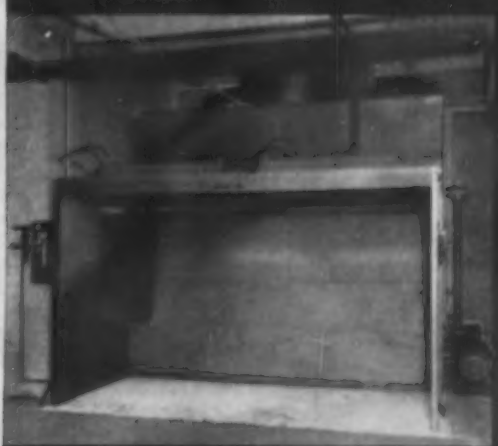
Write for Catalog S-6.





Water cooling tower

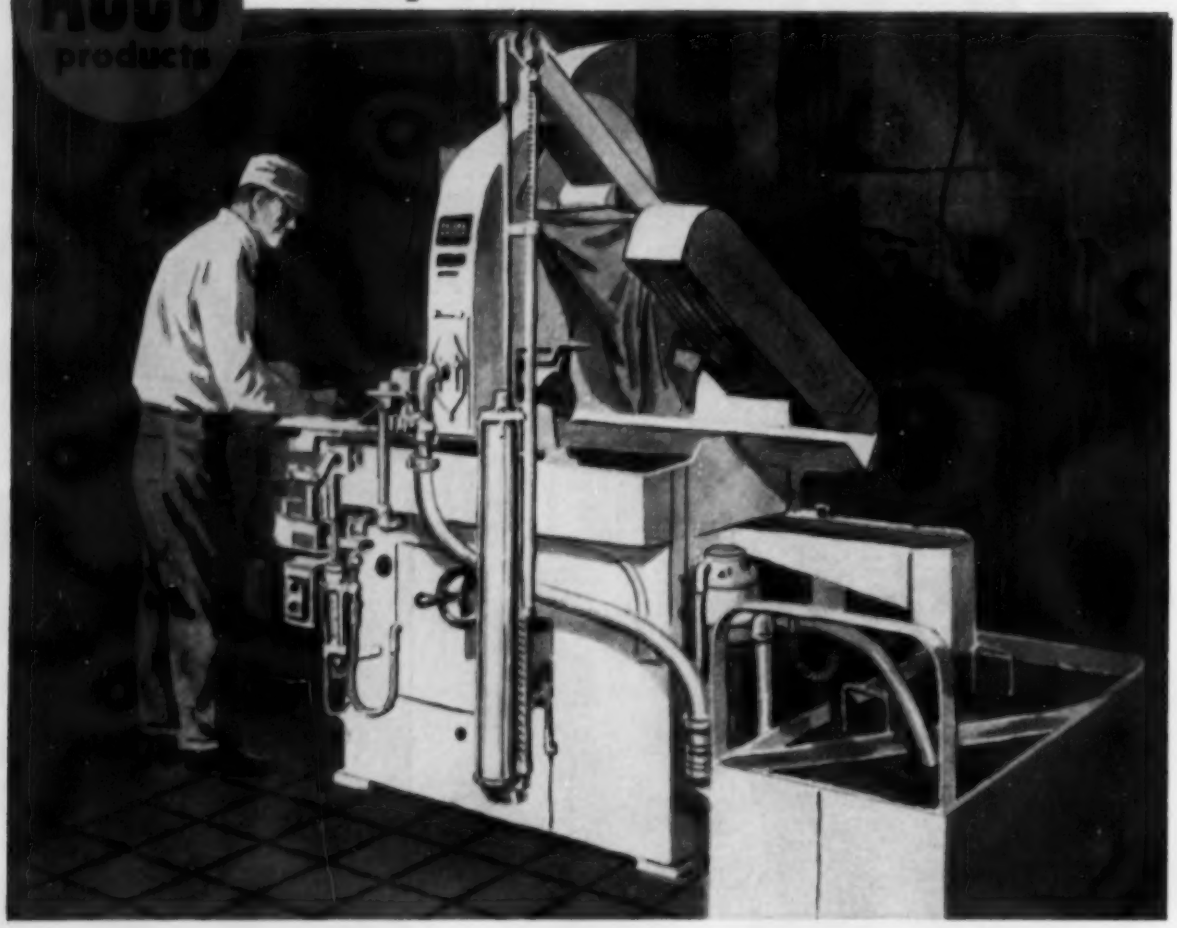
Dry auto spray booth



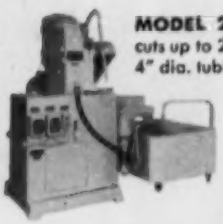
Water wash spray booth

ACCO products

Campbell Abrasive Cutters



Reduce cutting time on alloy and high carbon steel from minutes to seconds...



MODEL 223
cuts up to 2" dia. solids; 4" dia. tubing

MODEL 28 SEVER-ALL
dry cutter with capacity to 4" x 4" solids

MODEL 406 CUTAMATIC
cuts up to 6" dia. solids

• CAMPBELL Abrasive Cutters reduce your labor costs and the number of machines required. They do it by cutting alloy and high carbon steel in seconds instead of minutes. They give you a clean, smooth cut without work-hardening, and often eliminate finishing operations.

A complete line of CAMPBELL Abrasive Cutters—fully and semi-automatic—are available to fit your specific cutting requirement. CAMPBELL sales engineering experts will help you select the cutter your work demands. They will consult with you on cutting problems.

Why not increase YOUR cutting output per man hour?
Write for Bulletin DH-301 on "The Principles of Abrasive Cutting"

ACCO

Campbell Machine Division
AMERICAN CHAIN & CABLE
925 Connecticut Avenue, Bridgeport 2, Connecticut

Wet and Dry Cutters and Nibblers

CALENDAR
OF MEETINGS

March 21-23, Association of Iron & Steel Engineers: Western meeting, St. Francis hotel, San Francisco. Association address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

March 22-24, International Acetylene Association: Annual meeting, Shamrock hotel, Houston. Association address: 30 E. 42nd St., New York 17, N. Y. Secretary: H. F. Reinhard.

March 23-24, American Society of Mechanical Engineers: Annual engineering management conference, Statler hotel, Cleveland. Society address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

March 24-25, American Hot Dip Galvanizers Association Inc.: Annual meeting, Brown hotel, Louisville. Association address: 1506 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

March 24-25, American Machine Tool Distributors Association: Spring meeting, the Greenbrier, White Sulphur Springs, W. Va. Association address: 1900 Arch St., Philadelphia 3, Pa. Secretary: Thomas A. Fernley Jr.

March 28-30, American Institute of Electric Engineers: Materials handling conference, Hotel Cleveland, Cleveland. Institute address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

March 28-30, American Management Association: Manufacturing conference, Palmer House, Chicago. Association address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

March 28-April 1, Western Metal Congress & Exposition: Pan-Pacific auditorium, Los Angeles. Information: American Society for Metals, 7301 Euclid Ave., Cleveland 13, O. Secretary: W. H. Eisenman.

March 29-31, Steel Shipping Container Institute Inc.: Annual meeting, Biltmore hotel, Palm Beach, Fla. Institute address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

March 29-April 7, American Chemical Society: Spring meeting, Cincinnati. Society address: 1155 16th St., N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

March 30-April 1, American Institute of Electrical Engineers: American power conference, Hotel Sherman, Chicago. Institute address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

April 4-5, Stanford Research Institute and Atomic Industrial Forum: West coast conference on applied industrial uses of atomic energy, Mark Hopkins hotel, San Francisco. Information: Stanford Research Institute, Stanford, Calif.

April 4-6, National Fluid Power Association: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Association address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

April 11-13, Wire Reinforcement Institute Inc.: Annual meeting, the Greenbrier, White Sulphur Springs, W. Va. Institute address: National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

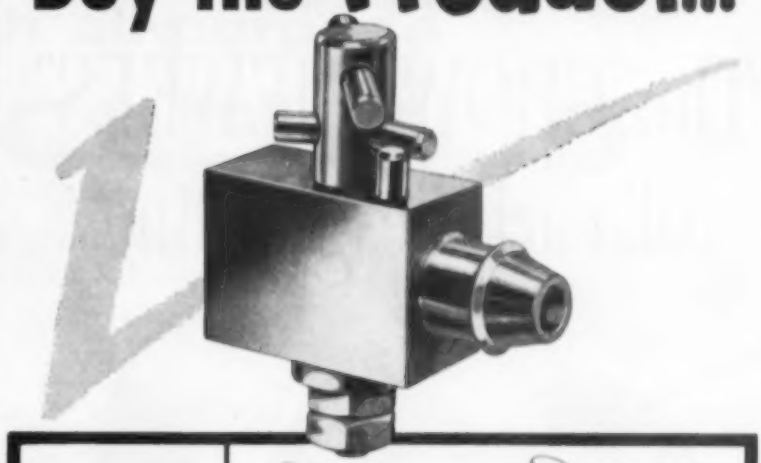
April 11-16, Concrete Reinforcing Steel Institute: Annual meeting, the Greenbrier, White Sulphur Springs, W. Va. Institute address: 38 S. Dearborn St., Chicago 3, Ill. Managing director: H. C. Delzell.

April 12-13, Bituminous Coal Research Inc.: Annual meeting, William Penn hotel, Pittsburgh. Association address: 803 Southern Bldg., Washington, D. C. Secretary: C. A. Reed.

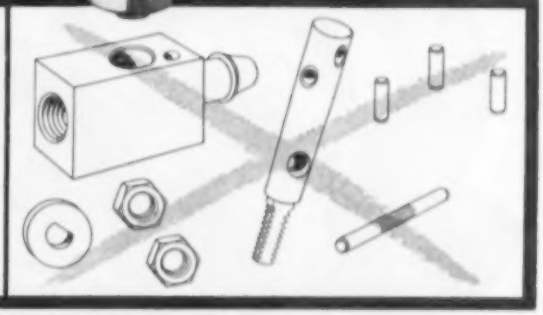
April 12-14, American Gas Association: Sales conference on industrial and commercial gas, Hotel Statler, Boston. Association address: 420 Lexington Ave., New York 17, N. Y. Secretary: M. A. Combs.

April 18, Foundry Equipment Manufacturers Association Inc.: Spring meeting, Sheraton-Carlton hotel, Washington. Association address: One Thomas Circle, Washington 5, D. C. Executive secretary-treasurer: C. R. Heller.

Buy the Product...



...Not the Parts



WESTERN supplies the whole assembly ...saves you time, money and headaches

The stainless steel valve assembly shown here is typical of mass-produced precision assemblies you can get from WESTERN. You need just one purchase order, and you get the plus advantage of centralized responsibility.

WESTERN supplies experienced engineering counsel plus the finest production facilities for the manufacture of precision assemblies and screw machine parts — from wire size to 4⅝" round. We do the *whole* job including all finishing operations — heat-treating, grinding and pentrating.

For fast delivery, precision quality and low cost put WESTERN on your production team.

Send us your blueprints for quotations *today*.

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Precision Screw Products, Parts and Assemblies Since 1873

Why you get top savings with Norton diamond wheels . . .

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Buying diamond wheels calls for the same trust in the supplier as buying gem diamonds. Right there is where Norton's long leadership in diamond wheel development and manufacture is your best possible safeguard. Only Norton offers you such long diamond wheel experience to help you produce more at lower cost.

Check these reasons why Norton diamond wheels are the recognized "Crown Jewels" of the entire field:

Norton was first to introduce the three major diamond wheel bond types — resinoid, metal and vitrified.

The sizing, grading and laboratory checking of diamonds used in Norton diamond wheels is done in Norton's own plant.

Norton duplicates specifications for each wheel type and size with utmost accuracy for uniform top performance.

The line of Norton diamond wheels is complete, with sizes and types covering every field — carbides, stone, glass, ceramics, electronics, etc. — where diamond wheels are used.

Norton diamond wheels for every need are quickly available from full stocks in Worcester and five strategically located warehouses.

See Your Norton Distributor

for further facts on Norton diamond wheel performance and applications. Ask him for the 142-page illustrated booklet, *Grinding Carbide Tools*. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

Making better products... to make your products better

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and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
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W-1612

For Top Savings in Production Grinding of single point carbide tools, use Norton vitrified bonded diamond wheels. Combining fast cutting action with high resistance to grooving, they're also ideal for grinding chip breakers and for a wide range of precision grinding. This Norton engineered bond holds each diamond particle for maximum useful cutting action and long, money-saving wheel life.

For Top Savings in Multi-Tooth Grinding, Norton resinoid bonded diamond wheels assure uniform grinding to each individual cutter tooth. Their extra fast cutting action and long service life are big advantages in precision sharpening. Two bond types — regular, for wet grinding and B6, for dry applications.

For Top Savings on Especially Severe Single Point Tool Grinding and where long life is most important, Norton metal bond diamond wheels are recommended. They're also most economical for many other jobs — such as cutting-off sintered carbide blanks, glass, ceramics, germanium and stone.

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with all-purpose

"TRICLENE"® D

TRICHLOROETHYLENE

Du Pont's Vapor Degreasing Solvent for Metal Cleaning

HERE'S PROOF:

These excerpts are from typical performance reports received from metalworking plants throughout the country.

"Fine, consistent performance. Both aluminum and brass parts are brighter. We've increased operating period between cleanouts by about 25 per cent."
—Parts Mfr., Mass.

"We're getting cleaner parts . . . extended operating time between cleanouts . . . reduced maintenance costs . . . effective recovery of stabilizers during normal distillation."
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"In cleaning small aluminum, silver, copper alloy and zinc and stainless steel parts . . . cleanout time of degreaser and still has been cut by one-third."
—Appliance Mfr., Indiana

"Degreased parts are brighter and cleaner. Chemical control of solvent greatly simplified and . . . we have peace of mind."
—Airplane Producer, Los Angeles

Use the coupon for more information about "Triclene" D—the best vapor degreasing solvent for *any* class work.

New All-Purpose

"TRICLENE" D

Trichlorethylene

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

SEND FOR THIS NEW DESCRIPTIVE FOLDER

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department S-321, Wilmington 98, Del.

☐ Please send me your descriptive folder on new, all-purpose "TRICLENE" D.
☐ Please have your representative call with the details.

Name _____ *Position* _____

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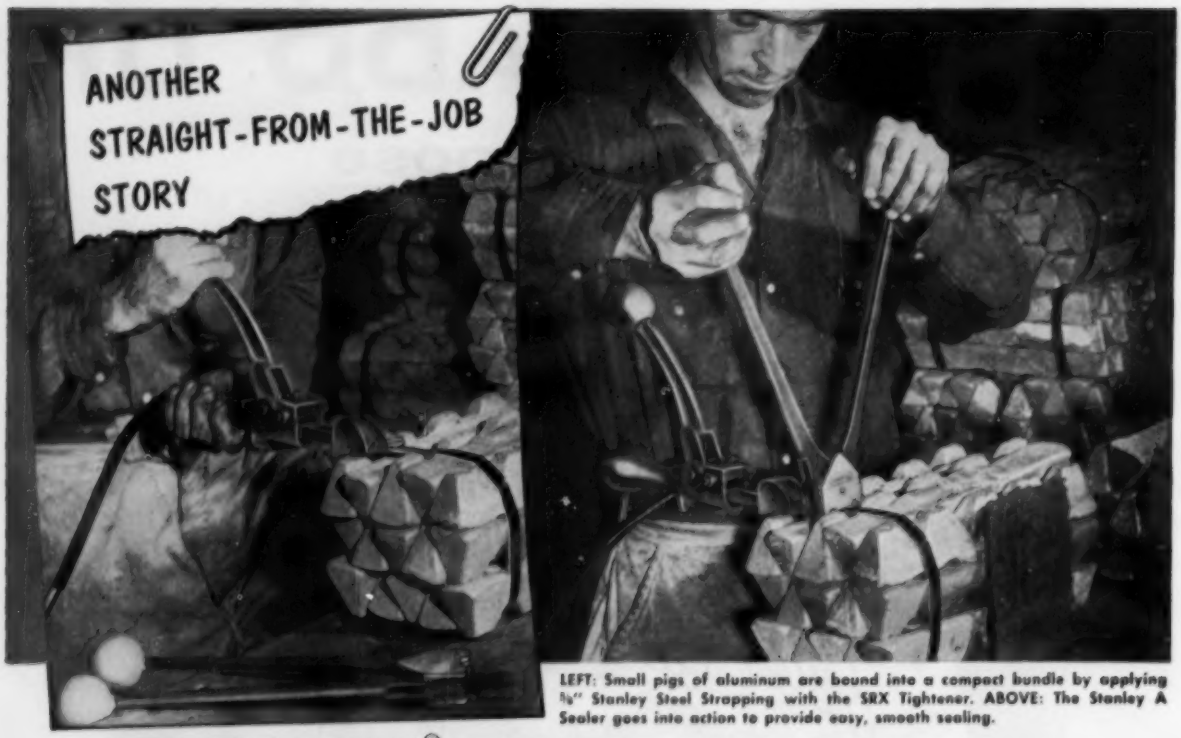

LEFT: Small pigs of aluminum are bound into a compact bundle by applying ½" Stanley Steel Strapping with the SRX Tightener. ABOVE: The Stanley A Sealer goes into action to provide easy, smooth sealing.

STANLEY® STEEL STRAPPING

Saves Time and Trouble

ABOVE: The operator has tightened the first band of 1¼" Car Band around a bundle of heavy, odd-shaped, hard-to-pack ingots. He speedily seals the band, using the Stanley KNA Sealer. BELOW: A second strap of Car Band is applied with the Stanley TXN Heavy Duty Tightener to package the bundle securely.

"Uni-ties" aluminum pigs and ingots to speed handling and inventory for ABCO Smelting & Refining Co. and their customers.

Shipping pigs and ingots of refined nonferrous metals without strapping meant time-consuming, piece-by-piece handling by ABCO and made receiving and inventory difficult for their customers . . . until STANLEY STEEL STRAPPING TOOLS AND EQUIPMENT came to the rescue! Almost any product from ingots to engines can be moved, shipped and stored easier, faster and more economically by "Uni-tieing" in self-contained bundles, or on skids and pallets, with STANLEY STEEL STRAPPING OR CAR BAND.

Just what are your packing and shipping problems? High labor costs? Tight storage space? Damage in transit? Write for the free folder "Uni-tie Your Products . . ." that will supply many of the answers you're looking for. Then, follow through by inviting the Stanley Steel Strapping Specialist to call. He has *all* the answers!

Write For Free Folder "Uni-tie Your Products . . ."

STEEL STRAPPING DIVISION
THE STANLEY WORKS
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STANLEY **INSURE IT — SECURE IT WITH STANLEY STEEL STRAPPING**

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS
STANLEY STEEL STRAPPING • STANLEY STEEL

The challenge of productivity, product quality and operating economy in hot strip mills grows tougher and tougher year after year.

That means rolls in hot strip mills that can stand the pace . . . give longer service before a change . . . are bound to reduce costs while rolling high quality products.

Mack-Hemp hot strip mill rolls are making outstanding records in many of today's high speed mills . . . the result of their long experience in roll-making backed by continual research plus close cooperation with mill operating staffs.

So, keep your eye on what's new and different at Mack-Hemp . . . it's your sure way of being able to maintain production figures high and cost figures low.

MACKINTOSH-HEMPHILL COMPANY

Makers of the rolls with the striped red wabblers

PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: *all types of cast mill rolls . . . improved Johnston patented corrugated cinder pots and slag handling equipment . . . Mackintosh-Hemphill rotary straighteners —electronically controlled contouring lathes—screw feed roll turning lathes—heavy duty engine lathes . . . shears . . . end-thrust bearings . . . steel and special alloy castings . . . reversing hot strip mills . . . Y-type cold strip mills*

Revolutionary way to grind metal sheets.....

This Hill-Acme Double Housing Abrasive Belt Taper, Grinding Machine, with its 84" wide x 40' long hydraulically operated table, was specially designed and built for these operations by the HILL ACME COMPANY, *Cleveland, Ohio.*

...with the Hill Acme precision grinding and polishing machine and Behr-Manning abrasive belts!

HERE'S ANOTHER MILESTONE in the swift advance of "industry's fastest developing production tool" — abrasive belts. The job is to grind and finish aluminum aircraft wing sections, so large that they are handled by a sheet loading device equipped with vacuum cups, and are then firmly held on the table of the machine by vacuum chuck. The belt itself is actually *86" wide.* Its exceptional size requires a special fixture to mount it on to the rolls of the machine. To make this big belt, several sections are joined, with all seams on the bias. Only meticulous precision methods and equipment, available at BEHR-MANNING, could successfully build these huge belts, assuring their constant uniformity.

Whether you're finishing big surfaces like this, or intricate contours requiring a belt only ¼" wide, check with your nearest BEHR-MANNING Application Clinic for the latest time-saving method. See your local BEHR-MANNING Representative, or write direct to Behr-Manning, Troy, N. Y., Dept. S-3.

In Canada: Behr-Manning (Canada) Ltd., Brantford.
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BEHR-MANNING
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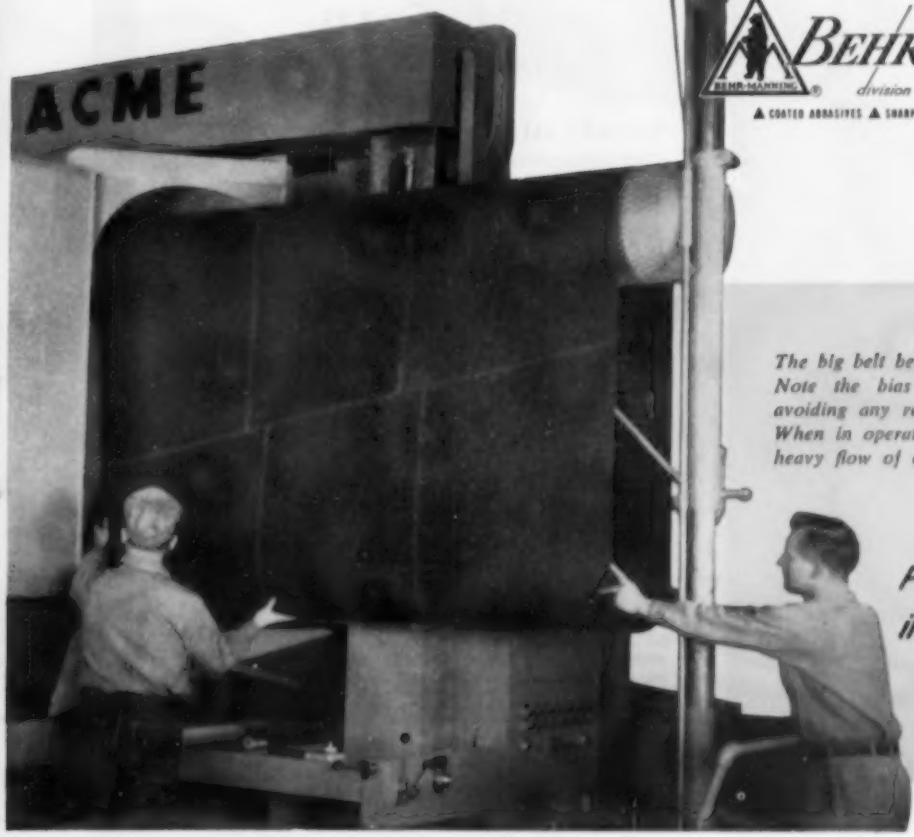

The big belt being transferred to the machine. Note the bias seams in the built-up belt, avoiding any resulting marking on the work. When in operation, the belt is enclosed, as a heavy flow of coolant is used.

For the newest in coated abrasives ...watch BEHR-MANNING!

G-3

"Me Switch? ...Never!"

"OK! SO I AM PIG-HEADED! I gave up trying other ropes years ago. It pays me to standardize on Roebling. Why? Well, with Roebling I get exactly the type of rope I need, when and where I need it . . . no makeshifts . . . no delays . . . and the performance is tops."

* * *

Why not find out for yourself? Call your nearest Roebling office or distributor for a Field Man. He'll recommend the ropes that perform and stand up best in the industrial field. And you'll learn what service really means!

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Subsidiary of The Colorado Fuel and Iron Corporation

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1905 **Thompson Grinders** **1955**

The only manufacturer of a complete range of heavy duty and light duty surface and contour grinders

THE THOMPSON GRINDER COMPANY, SPRINGFIELD, OHIO

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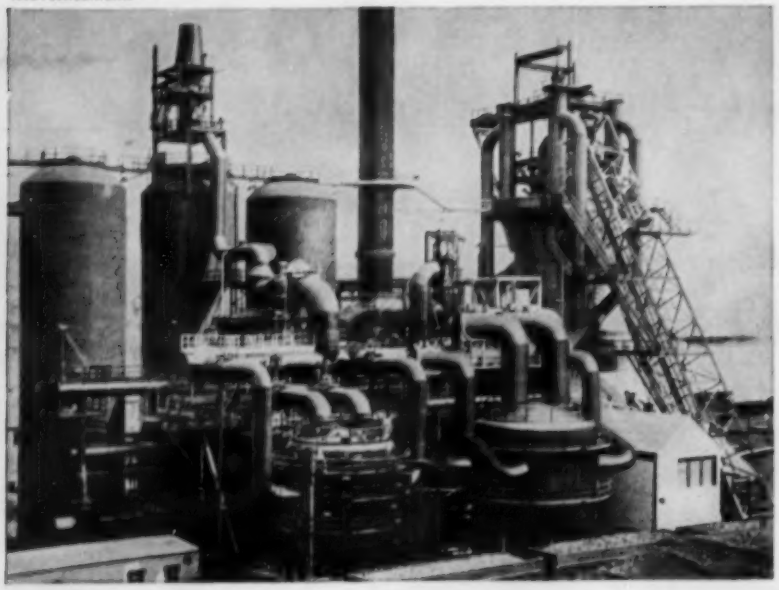


How Cottrell Precipitators Clean Gas in the Steel Industry

Iron Ore Sintering Plants

The first commercial Cottrell installation for cleaning gases coming from the iron ore sintering machines was placed in operation in 1952 with collection efficiencies exceeding 95%. In this installation the gases leaving the windboxes of the sintering machine pass to a flue, then to a mechanical collector, to the induced draft fans, to the precipitator, and then to stack. The gases enter the precipitator at temperatures of about 250 to 300F, with water vapor content of about 8%. The dust collected is dry and quite fine. The precipitators used on this application are of the horizontal steel plate type.

Iron Blast Furnaces

The cleaning plant in most iron blast furnace installations consists of the preliminary stage (dry dust catchers), the primary stage (water scrubbers) and the secondary stage (water-flushed Cottrell Precipitators). Dust and fume content of the gas is reduced to the range of 0.1 to 0.3 grains per cubic foot of gas corrected to standard conditions before it reaches the Electrical Precipitator. The function of the precipitator is to further clean this gas to a final dust content ranging in most cases from 0.005 to 0.01 grains per cubic foot, depending on how the gas is to be used.

Open Hearths

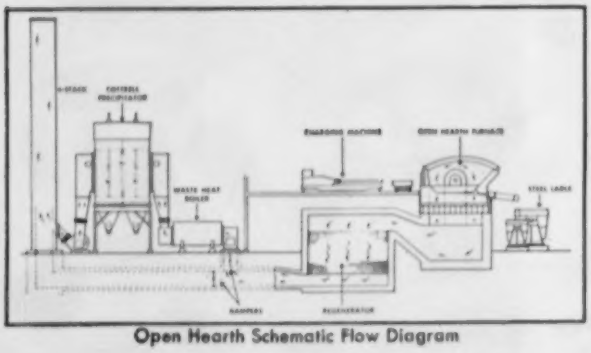
This problem involves the cleaning of combustion gases coming from furnaces, usually oil-fired, and carrying in suspension a heterogeneous mixture of very fine metallic oxides.

After extensive research and pilot plant studies, Research-Cottrell completed the first commercial precipitator installation for cleaning open hearth gases in 1951. Test results at rating indicated efficiencies of over 95% were obtained. Most of the time there was no visible discharge.

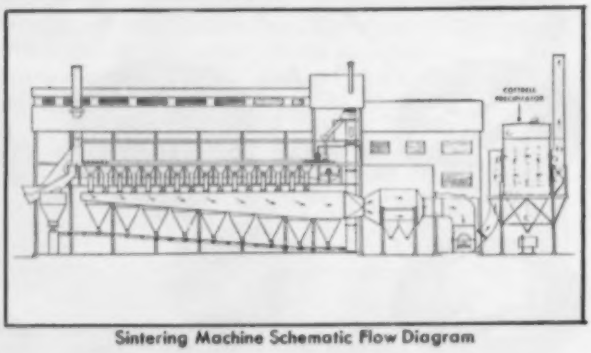
Other Steel Applications

In addition to the above, Research-Cottrell installations are being used for detarring by-product coke oven gas, cleaning oven fuel gas and producer gas, and cleaning ferro-manganese blast furnace gas.

Detailed information on all these applications is available through your nearest Research-Cottrell office.



Open Hearth Schematic Flow Diagram



Sintering Machine Schematic Flow Diagram

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RC149

MODERN MACHINE TOOLS AREN'T AN

Production Pointers from GISHOLT

GISHOLT

TIME-SAVING IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help cut time and costs in your own work.

GISHOLT JETRACER SIMPLIFIES CONTOUR BORING OPERATIONS

Low-cost Unit Added to Late Model Saddle Type Turret Lathe

How to get still more production and lower costs out of present equipment? Mission Manufacturing Company, Houston, Texas, can show you a good example in the machining of steel valve bodies.

The time and money saver is a hydraulic tracer unit, added to a Gisholt 3L Saddle Type Turret Lathe. Operation of the turret-mounted *JETRACER* is simple. The entire unit, including template, is self-contained and mounted on a single face of the hexagon turret. This in no way restricts use of the overhead pilot bar.

With the Gisholt *JETRACER*, production has been increased 25%. A low-cost, standard, single-point tool replaces expensive special sizing tools. Considerable time is saved on gauging, since only one diameter needs to be checked. Uniform quality is an added advantage automatically achieved, because the chance for human errors is done away with in boring operations.

New ideas pay off handsomely: Increased output plus repetitive accuracy in difficult boring operations result from this turret-mounted Gisholt JETRACER.

◀ Note template and stylus which follows contour for boring operation.

Typical workpieces, rough and finished, handled in this setup. ▼

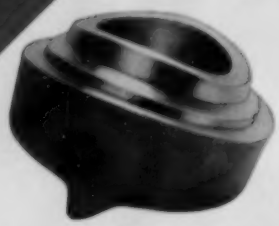
EXPENSE...THEY'RE MONEY-MAKERS

GISHOLT

TIME-SAVING IDEAS

MODERN MACHINE TOOLS AREN'T AN

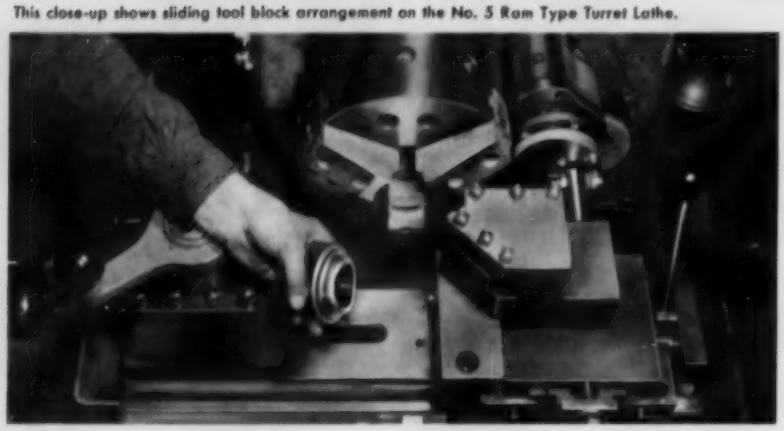
WAVE FACES EASILY GENERATED WITH THIS SLIDING TOOL BLOCK SETUP



Simple Solution to Unusual Job on a Ram Type Turret Lathe

Talk about tricky shapes to generate, look at this lug insert forging. Yet it's easily done with this setup on a Gisholt No. 5 Ram Type Turret Lathe.

This close-up shows sliding tool block arrangement on the No. 5 Ram Type Turret Lathe.



For chucking there is a spring-loaded locator in the spindle for correct radial location on the rib on the back of the part. Tools on the hexagon turret drill, bore, co-bore, rough turn, undercut and chamfer.

The problem surfaces are generated by tools in a special sliding tool block on the rear of the cross-slide. The block is actuated by a cam which rotates in time with the spindle. A spring-loaded roller attached to the sliding tool block follows the contour of the face of the cam, causing tools to perform contour machining on the workpiece.

Expert tooling with sliding tool block arrangement and the use of the right machine give a low 4.3-minute f. t. f. time including this unusual facing job.

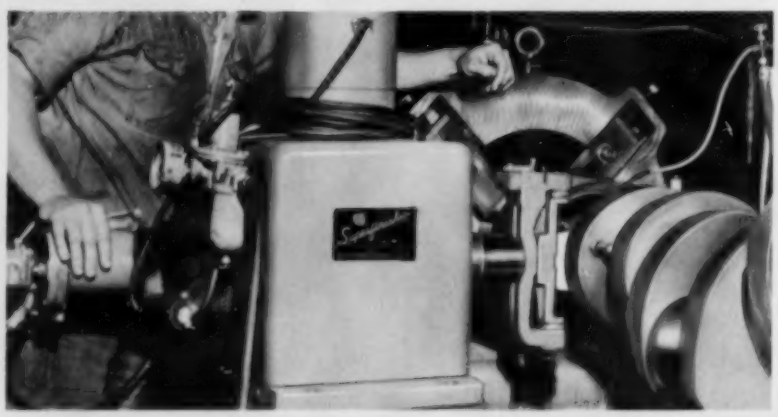
LARGE CRANKSHAFTS SUPERFINISHED WITH LOW-COST LATHE ATTACHMENT

Better Wearing Surfaces Achieved Without Adding Extra Operation

To get the longer bearing life demanded of crankshafts in today's higher speed diesel engines, this manufacturer uses Superfinish...and at a minimum of equipment cost.

The main and crankpin bearings are turned on a lathe to .001-inch tolerance. Then, without removing the crankshaft from the lathe, a Gisholt No. 4 Superfinishing Attachment, which has been substituted for the front tool post, is used to Superfinish these vital surfaces down to 10 micro-inches RMS. The required micro-inch surface finish is produced without an intermediate grinding operation.

You can see the savings in time and equipment by this setup. The quick Superfinishing operation exposes true base metal so that the crankshaft operates on harder, smoother bearing surfaces for a longer trouble-free service life.



With Superfinisher attachment mounted on the lathe, machining and Superfinishing jobs are done in one chucking.

Finer bearing surfaces and improved geometry by Superfinishing make these crankshafts better performing—at less cost than former finishing methods.

Helpful Catalog, recently printed, gives explanation of Superfinish and shows many applications. Write for your copy.

Your New Machine Tools— Cash?...On Time?...Lease?

What's the most practical way for you to obtain new machine tools? You have a choice of several plans... all clearly explained and illustrated with examples in this new bulletin. Ask for your copy of Form P-1173, "What You Should Know About Buying and Renting Machine Tools."

GISHOLT

LOOK AHEAD...KEEP AHEAD...WITH GISHOLT

GISHOLT

TIME-SAVING IDEAS

HOW BRAKE DRUM OUTPUT WAS INCREASED 50%

Precision Taper Boring Extra Benefit of Fastermatic Automatic Turret Lathe

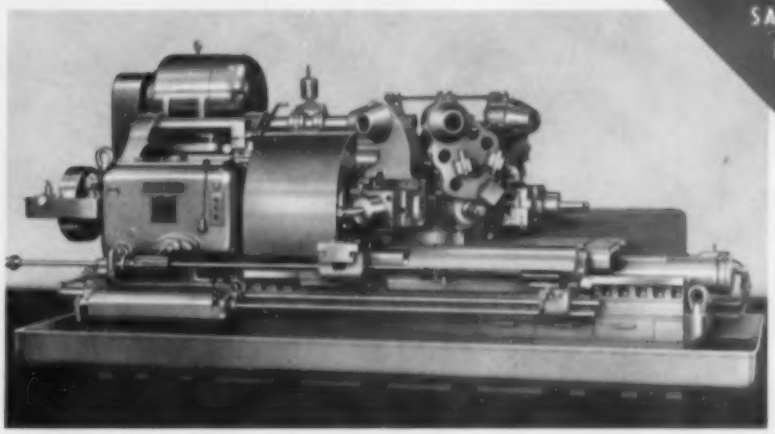
Greater output and greater precision were the objectives when refiguring this job...machining road grader brake drums.

The job is now handled on a Gisholt 4F Fastermatic Automatic Turret Lathe. This is equipped with special jaws to compensate for uneven chucking surfaces and hold the drum rigidly for the multiple cuts.

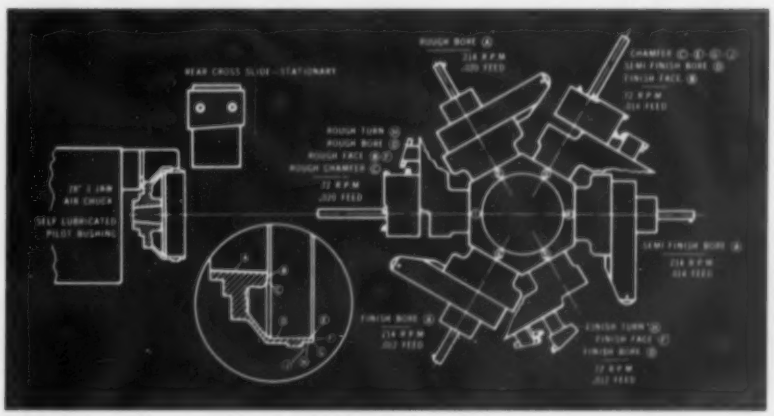
Taper boring (A) is done with a boring bar and cutter mounted in a turret facing slide tool. Three of these slide tools are used with a special cam block mounted on the stationary rear cross-slide which guides the spring-loaded slide tools along the taper angle of the bore. Result is precision gauge fit every time. These slide tools are alternated on the turret with other standard tools which bore, face, chamfer, and turn other sections of the drum.

The large parts are completed in 23.1 minutes—a 50% reduction in f.t.f. time of the former method.

The Fastermatic has the right combination of rigidity, accuracy and automatic features to provide important time- and labor-savings on this job.



Gisholt 4F Fastermatic Automatic Turret Lathe



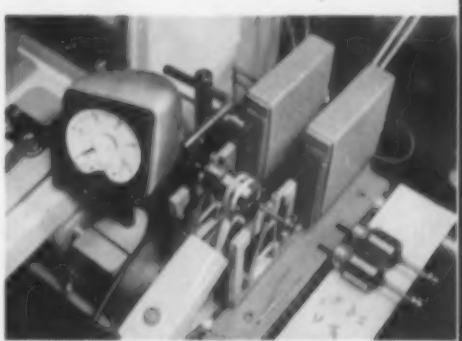
EASIER CALIBRATION SPEEDS BALANCING OPERATION

Amount of Required Correction Directly Indicated on Gisholt DYNETRIC Balancers

Production balancing of universal motor armatures is generally at a rate of 125 parts per hour, including measurement, correction and inspection. Fast, accurate, easy-to-operate equipment is a necessity.

This manufacturer uses a Gisholt OSB Bench Balancer to dynamically balance every armature. Six different sizes of extruded aluminum strip are used to correct for balance. The direct reading amount meter, calibrated so that one unit represents the smallest strip, quickly indicates which of the six sizes must be used to produce balance.

It takes only 15 seconds in this case to determine accurately which strips are to be used and the positions in which they are to be placed at each end of the armature. Can you imagine anything easier?



Gisholt Balancing Machines offer many fine features which add up to quick, accurate, low-cost balancing operations. Ask for your copy of new general balancing catalog, No. 1109-A.

DYNETRIC BALANCERS GISHOLT

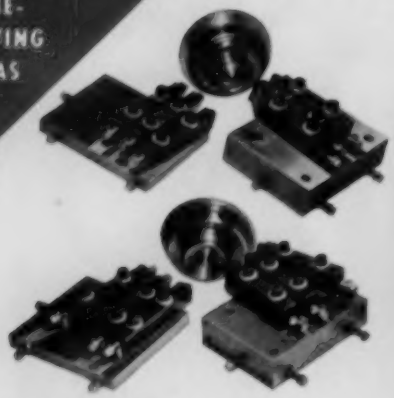
GISHOLT

GISHOLT

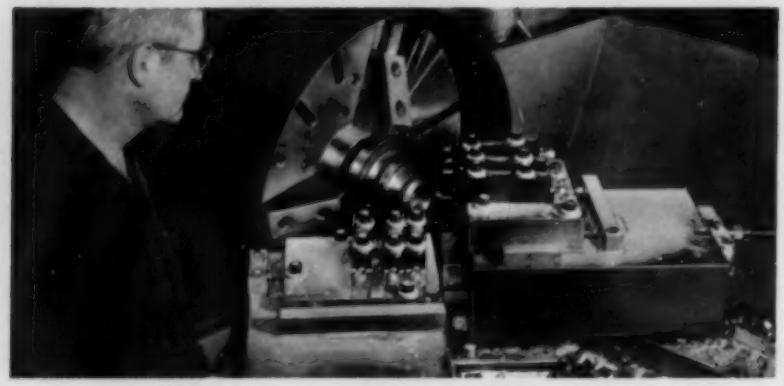
TIME-SAVING IDEAS

TIP FOR FAST CHANGEOVERS... PRE-SET TOOLING LIKE THIS

How a little extra planning saves a lot of money —with the Gisholt Simplimatic Automatic Lathe



(Right) Tooling for one type cutter bit. Photos above show pre-set tooling for two other types.



Here three different types of steel oil well cutter bits, each in two sizes, must be handled. Good reason for carefully planning changeover.

The solution is nicely provided by a Gisholt Simplimatic Lathe and pre-set tooling. Each type of cutter bit has its own tooling which is set before being mounted on the tool slides. Special tool bits are bolted in milled slots on steel spacer plates. These are then mounted on the slides. The Simplimatic's front and rear slides have swivel bases to facilitate correct angular adjustment. Time for work-pieces shown in photos is only 2.40 minutes.

Changeover with pre-set tooling on the Simplimatic saves time in handling these six different workpieces.

SPECIAL TOOLING COMBINES TWO OPERATIONS IN ONE CHUCKING

No. 12 Hydraulic Lathe Uses Auxiliary Slide to Form Grinding Relief

Headstock-mounted slide feeds tool at 45 degree angle to form grinding relief. (tailstock retracted to show tooling)

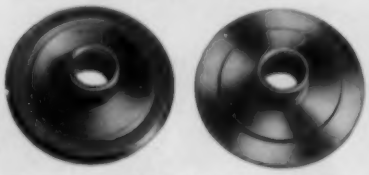
How to finish these steel turbine converter hub forgings in one chucking with a minimum of special tooling?

First, the work is chucked in the splined I.D. on a special splined mandrel, the end of which rotates slightly off-center to grip and drive the part. A tailstock provides additional support.

Tooling on the front carriage and rear independent slide finish turns the two hub diameters, finish faces the flange and sizes the pilot diameter. Since the front carriage and rear slide are used for standard machining operations, they are not available for forming the grinding relief between the hub diameter and its adjacent face. Instead, a headstock-mounted auxiliary slide is used. Movement of the front carriage actuates this slide which feeds in at a 45 degree angle to form the grinding relief.

Floor to floor time is only .4 minute with the auxiliary slide permitting the part to be finished in one chucking.

An extra operation is saved by this relatively simple auxiliary slide arrangement on the No. 12 Hydraulic Automatic Lathe.



Rough and finished workpieces showing surfaces machined in this operation

No. 3-455

635

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY Madison 10, Wisconsin

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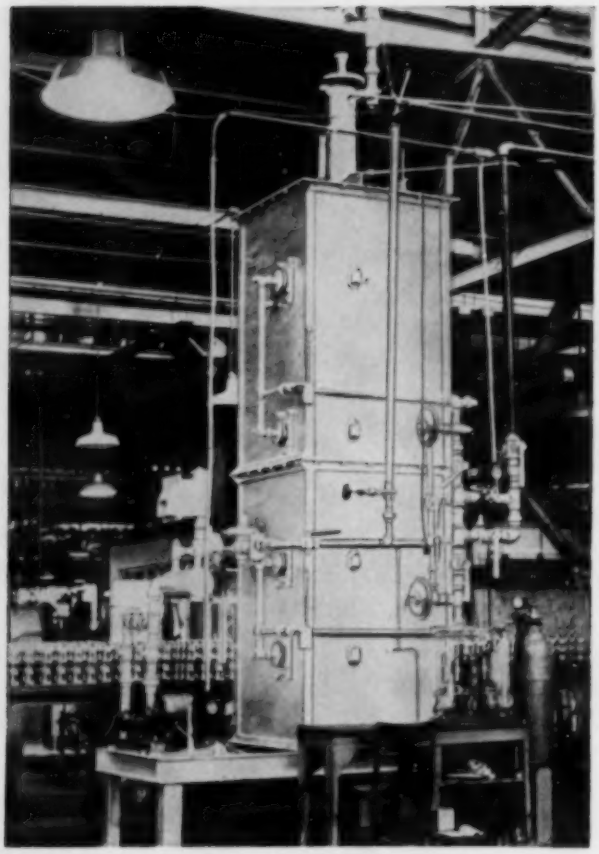

FIRST RX® GAS GENERATOR STILL PAYING OFF

This "pioneer" at Warner Gear Division, Borg-Warner Corp., Muncie, Ind., shows some of the advantages of 'Surface' endothermic gas generators. This was the first practical catalytic gas generator for continuous bright gas carburizing . . . and it's still in use. It has paid for itself many times since it started operating on April 4, 1941. As a result, Warner Gear has standardized on 'Surface' RX® gas generators for its gas carburizing operation; the world's largest single installation.

Surface Combustion has installed hundreds of RX® gas generators since 1941. They contribute to the making of every car made in the U. S. New developments have improved their accuracy, reliability and output. Users have found lower maintenance costs.

Find out what RX® atmosphere gas generators can do for *you*. Call for a sales engineer or write for Literature H54-6.

Surface
HEAT TREATING EQUIPMENT

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32 pages; 92 pictures and sketches

You belong in this picture

An evening with this interesting booklet will bring you the fascinating story of alloys and what they do for today's better steels and irons. For your copy of "Hot-Metal Magic," write to Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, Room 308, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario.

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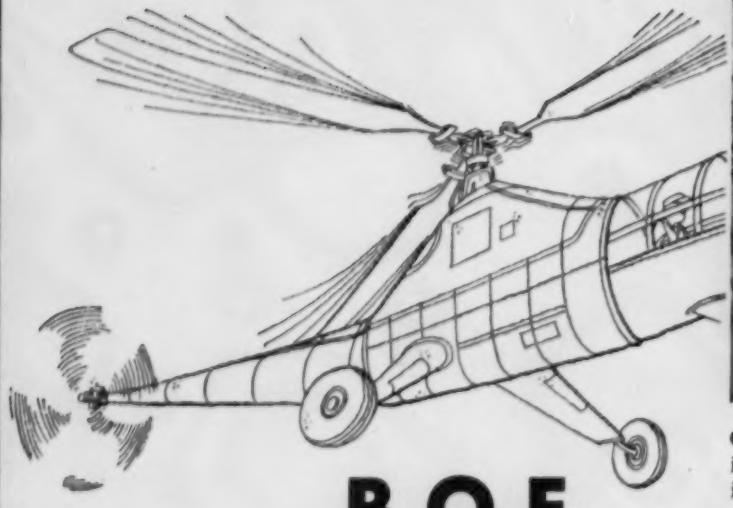

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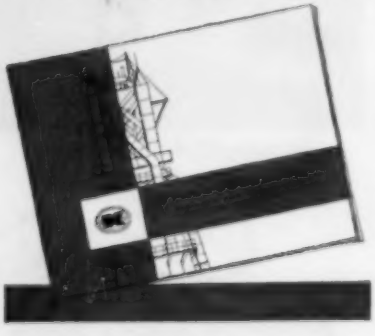
Through the application of years-ahead design, Kaiser Engineers can provide your firm with cost-saving features in your next expansion or new construction project.

Write today for Kaiser Engineers' new steel industry brochure No. 106.



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Carboloy® Grades 350, 370 carbides increase production as much as 3⅔ times

BEFORE CARBOLOY GRADE 370, 17 other carbides were tried by the Jet Division, Thompson Products, Inc., for facing 310 stainless-steel jet engine compressor frames. Best any carbide could do was 3 pieces per 8-hour shift. With Grade 370, production jumped to 14 pieces. Downtime losses were cut because Grade 370 inserts machined almost 3 times as many pieces per grind.

SETUP: Material—310 stainless steel. **Speed**—340 SFPM. **Feed**—0.008 inch. **Depth of cut**—0.100 inch at 36 rpm. **Coolant**—Yes.

BECAUSE THEY CUT MORE STEEL PER MINUTE, new Carboloy medium-duty Grade 350 and heavy-duty Grade 370 are drastically reducing metal-working costs in plants throughout the United States.

Reports from users prove that "350" and "370"—

1. Cut more cubic inches of steel per minute than any other carbides—increasing production as much as 3⅔ times
2. Assure longer tool life
3. Decrease downtime
4. Provide wear resistance and extreme toughness never before experienced
5. Operate at temperatures as high as 1800° F. without tip deformation.

Because of these benefits, and their ability to operate at unusual feeds and speeds, Grades 350 and 370 enable you to obtain optimum results from your machine tools.

The performance of these two carbides is a standing challenge to all operating management of metal-working plants. For it shows the way to increased production and lower costs in metal-cutting operations—*now*. Write for case histories of in-plant operations.

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11141 E. 8 Mile Road, Detroit 32, Michigan

Carboloy Created-Metals for Industrial Progress

Steel-Weld FABRICATION

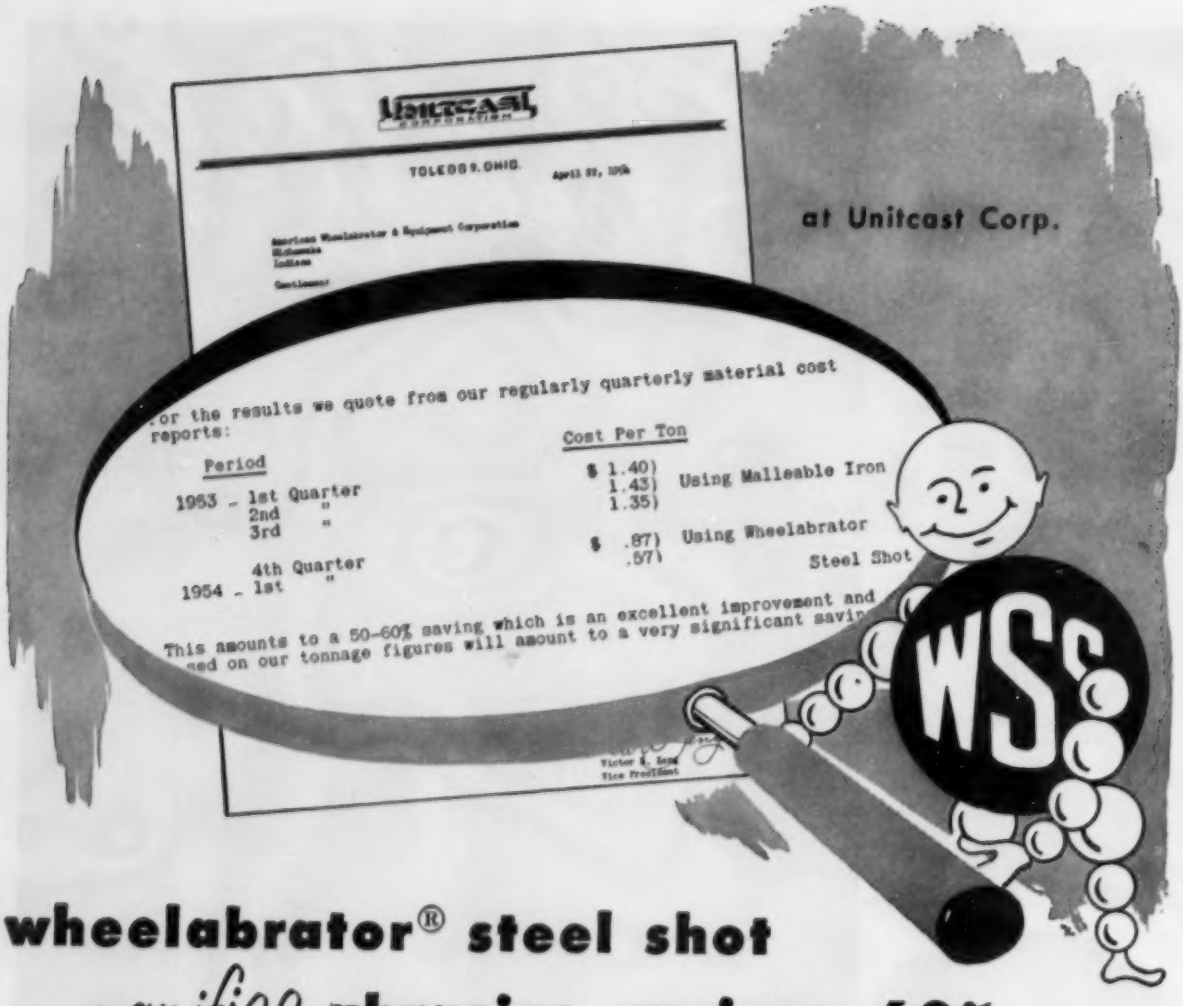
Use WELDED STEEL for Greater Strength with Less Weight!

Illustrated above are four of fifty-eight columns fabricated, machined and assembled by Mahon for a well known press manufacturer. These and the parts and assemblies illustrated at left are typical of thousands of Steel-Weld Fabricated units produced and machined by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. If you use weldments, or if parts of your product could be produced to better advantage in welded steel, you will find in the Mahon organization a unique source with complete facilities for design-engineering, fabricating, machining and assembling. Send prints for fast action, or have a Mahon engineer call to discuss your requirements. A Booklet showing Mahon facilities and examples of superior craftsmanship will be forwarded on request.

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN

Engineers and Fabricators of Steel in Any Form for Any Purpose

MAHON


at Unitcast Corp.
TOLEDO 9, OHIO
For the results we quote from our regularly quarterly material cost reports:
Period
Cost Per Ton
1953 - 1st Quarter $ 1.40)
2nd " 1.43) Using Malleable Iron
3rd " 1.35)
4th Quarter $ .87) Using Wheelabrator
1954 - 1st " .57) Steel Shot
This amounts to a 50-60% saving which is an excellent improvement and
ased on our tonnage figures will amount to a very significant savin
Vice President
WS

wheelabrator® steel shot *magnifies* abrasive savings 60%

Every ton of castings cleaned at Unitcast Corp. magnifies the savings this Toledo firm has made by switching from a malleableized abrasive to Wheelabrator Steel Shot.

Abrasive costs per ton of material cleaned have dropped from $1.43 to 57c — a saving of 86c a ton by using Wheelabrator Steel Shot. This saving grows to $86 for every 100 tons cleaned. It means $1 spent for Wheelabrator Steel Shot buys as much cleaning as $2.50 spent for malleable iron abrasive.

The hardness of Wheelabrator Steel Shot (42 to 50 Rockwell C), its toughness, native impact strength, and rebound properties guarantee you more for your abrasive dollar when you use this superior electric furnace steel shot. Why not try it yourself? For complete details, write for Bulletin 89-B.

American WHEELABRATOR® *trail blazer of industrial progress*

AMERICAN WHEELABRATOR & EQUIPMENT CORP., 509 S. Byrkit St., Mishawaka, Indiana

dependable!

WEIRTON

high carbon strip
cold-rolled spring steel

for high-speed blanking or forming

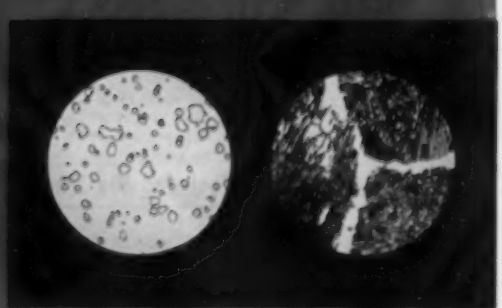
Where high fatigue-resistance is a principal factor, Weirton cold-rolled spring steel furnishes high carbon strip in the consistent uniformity necessary to meet the most exacting requirements of a wide variety of products. The close manufacturing control featured at Weirton results in several unique and highly desirable qualities—such as accurate response to heat treatment . . . uniformity of gauge and width . . . uniform chemical and physical properties . . . exact consistency of grain structure . . . controlled decarburization limits.

Pearlitic and spheroidized structures are available with desired chemical analyses and for specific heat treating and hardness. When you call Weirton you call for easier blanking and cold forming. And, at Weirton, you get what you call for.

WEIRTON STEEL COMPANY

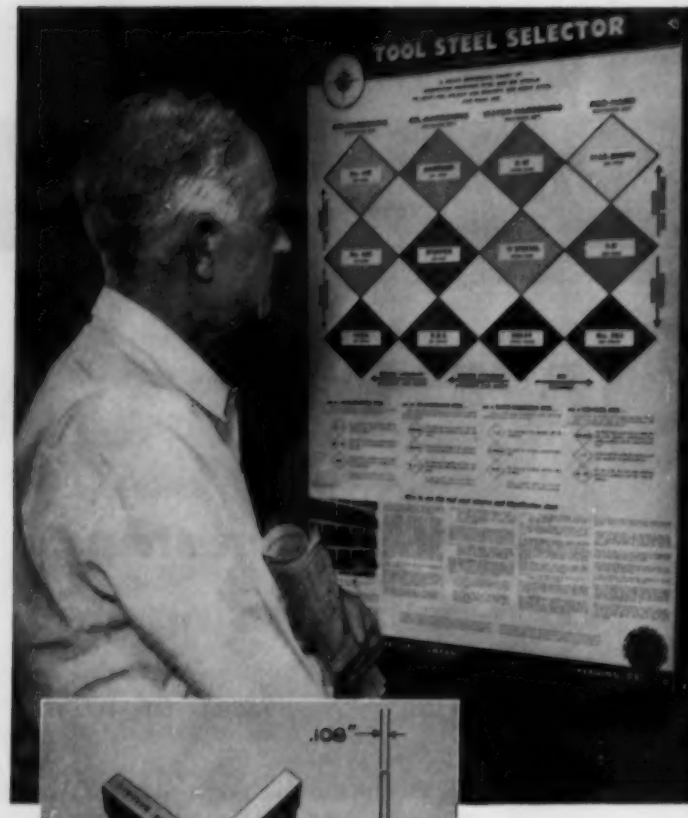
Weirton, West Virginia

NATIONAL STEEL CORPORATION

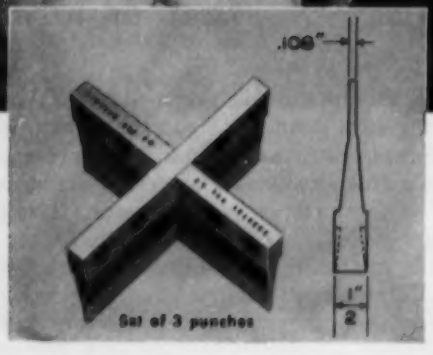


The photomicrograph on the left illustrates Weirton high carbon strip that has been spheroidized and annealed—soft and ductile—ideal for cold-forming operations. The one on the right shows the pearlitic steel structure, temper-rolled in controlled hardness and strength for clean, economical blanking procedure.

WEIRTON STEEL COMPANY



How One Toolroom Superintendent Used This Chart



Job: A set of three special punches used on a high speed machine to close the joints on prefabricated metal window frames made from ⅛" thick SAE 1010 steel.

Problem: Many types and grades of tool steels were tried, but all lacked the necessary toughness and hardening safety. Best service life from any before breakage was three days. Because a set of 3 punches cost hundreds of dollars to make, the low production was hiking up operating costs at a prohibitive rate.

Solution: In a final effort to find a steel with enough toughness and safety in hardening, the Toolroom Superintendent turned to Carpenter and the Matched Set Method. Carpenter R.D.S. (Oil-Tough) was indicated.

Results: Now punches stay in service for about three months, and instead of breaking, they wear out in service.

. . . To Hold Down Operating Costs

In working with many men responsible for tools and dies, we've discovered a simple but often overlooked fact: The man who approaches each tool and diemaking job with the idea of . . . *Simplifying* it, *Reducing* heat treating hazards, and *Improving* previous performance . . . is bound to do a better job.

If you or your men have that approach, Carpenter wants to be of help. We like to think of our association with customers as a "partnership" in a mutual effort to get best possible results. And here's what we offer: Practical, *workable* help at *every step* from diemaking, to heat treating, through on-the-job performance.

And that's why it works . . . both of us have a common goal. Just one example of hundreds is found in the Field Report shown to the left.

One part of this program is the Carpenter Matched Set Method. It is an accurate blueprint for selecting the *one* die steel ideally suited to give you the results you want. It is all outlined in a convenient, full-color Wall Chart available to you.

And that's only a part of the program . . . a program that involves almost 70 years' experience in the development of new and constantly-improved die steels. We're ready to work for you, now. Simply call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

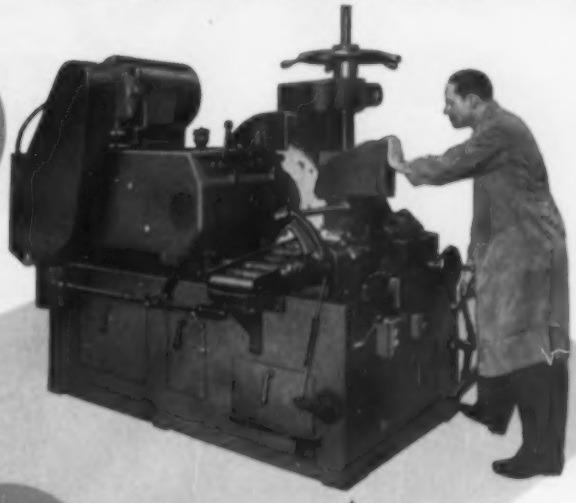
Carpenter STEEL — Matched Tool and Die Steels

IMMEDIATE DELIVERY from local warehouse stocks

Export Department: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

THE Triple-Chip METHOD IS A Triple-threat TO HIGH CUTTING COSTS

CIRCULAR SAWING MACHINES



M. & M. No. 3 circular sawing machine for cutting off metal up to 11-5/8" diameter.

SAW BLADE SHARPENERS

Three automatic M. & M. blade sharpeners impart the Triple-Chip or conventional grind to M. & M. saw blades up to 120" diameter.

SAW BLADES

M. & M. saw blades cut any machinable metal. Cut-off blades: segmental — 11" through 120" diameter; solid — 8" through 20" diameter. Slitting saws — 3" through 8" diameter.

You may profit immensely by applying the M. & M. Triple Threat to *your* cut-off costs. Machine, blade, and grinder, made by the first company to build all 3, often effect phenomenal savings, as proved by detailed case studies. *Just such a study of your job is yours for the asking.* We offer you an unmatched experience in the sawing of metal, ferrous or non-ferrous, titanium to magnesium, from 1/4" to 43" diameter.

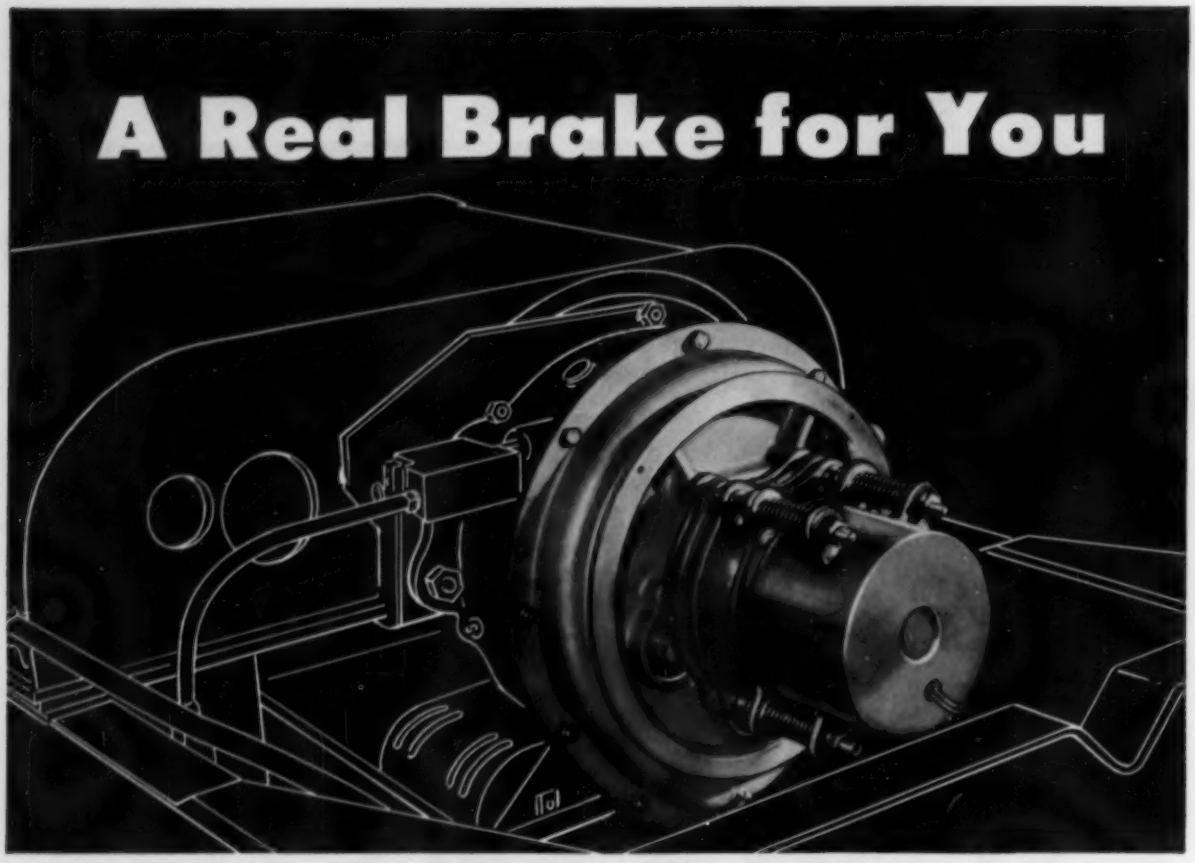
THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders also of Production Milling, Vertical Turning, Automatic and Special Machines

A Real Brake for You

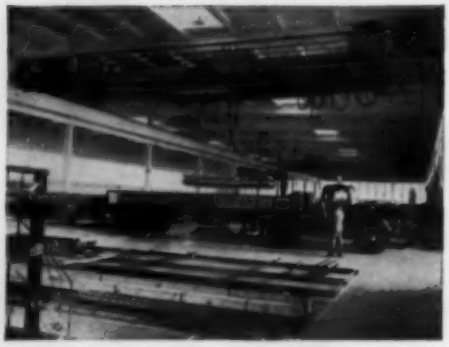


now yours on P&H Trav-Lift Cranes
Rectifier Brakes to end all AC Brake Troubles

Whichever your power, braking is always DC. Action is smooth, instantly responsive, as only 1/32" movement is required to open the brake. In the entire brake there is only *one* simple adjustment.

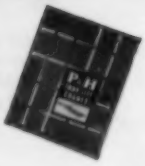
Ended forever are costly AC brake problems . . . the headaches you're living with right now. No flared laminations . . . No coil failures due to improper armature seal . . . No linkage troubles; there is no linkage.

Sound good? It is good . . . and only the P&H Trav-Lift Crane offers this new rectifier brake. It's another P&H advantage . . . the result of the entire crane-building job by P&H, electrical equipment included . . . to give you what's new and better in cranes. P&H Overhead Crane Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.



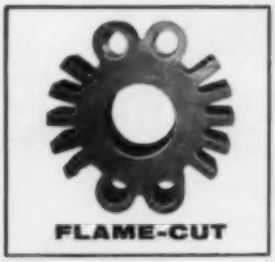
SEE THE TRAV-LIFT "IN YOUR OWN WORK."

New bulletin has picture sections showing Trav-Lift cranes in all services, tells about P&H Rectifier Brakes and other features. For all handling jobs up to 15 tons, floor or cage control. Ask for Bulletin G-51.

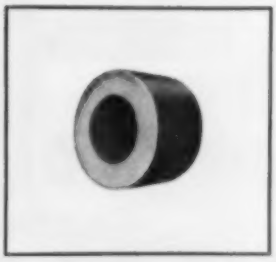


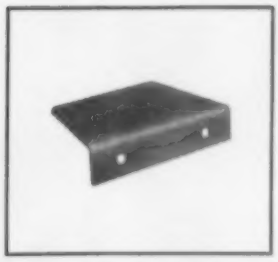
HARNISCHFEGER

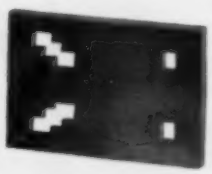
the P&H Line



FLAME-CUT







SHEARED

HOW MUCH WOULD YOU SAVE WITH PRE-FORMED PARTS?

BLANKED

PRESSED

BENT

LUKENS

STEEL PLATE SHAPES SERVICE CAN HELP CUT COMPONENT COSTS 5% TO 25%

You can slash production costs 5% to 25% . . . and get greater versatility and design freedom . . . with parts pre-formed from rolled carbon, alloy or clad steel plate.

Using By-Products Steel Co.'s Steel Plate Shapes Service, you get close tolerances that permit quick and easy incorporation into assemblies, often without further finishing. Men and machines can be freed for other work, and reduced fit-up time and the elimination of production steps speeds operations.

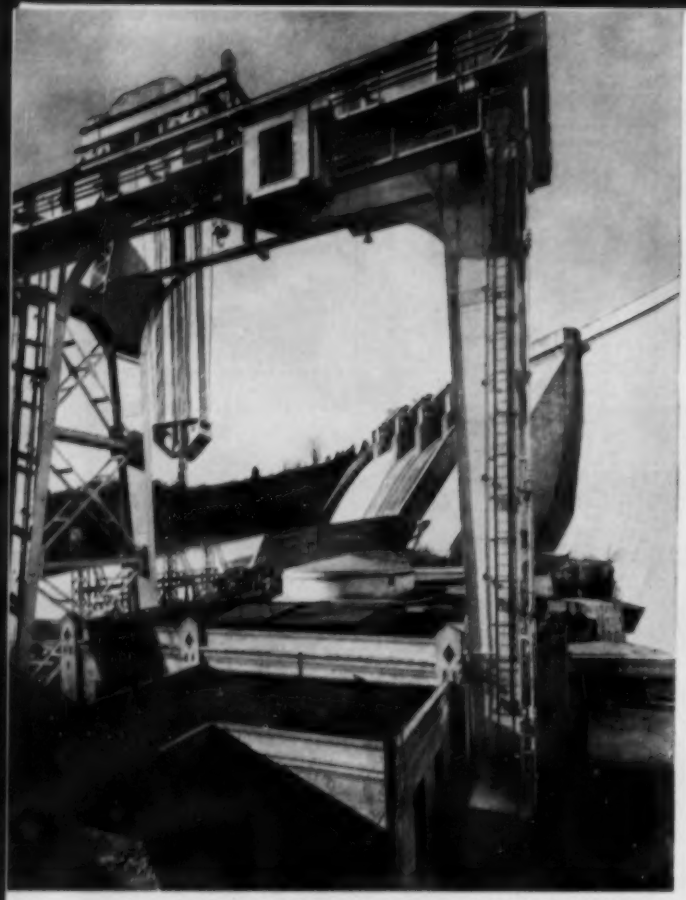
Reduced freight and handling charges and less need for costly plate inventories are additional benefits of this service. Over 150 major machines and an extensive standard die stock are available. Work can be done directly from blueprints in the finish you specify: as formed, rough- or finish-machined.

Your parts can be formed from plates up to 195" wide or 25" thick. Our location adjacent to the facilities of the world's leading producer of specialty steel plate assures flexibility in forming and heat treating to your specifications. For additional information on how you can put this Service to work, write on your letterhead for Bulletin 712. Address: By-Products Steel Co., 742 Strode Avenue, Coatesville, Pennsylvania.

STEEL PLATE SHAPES SERVICE

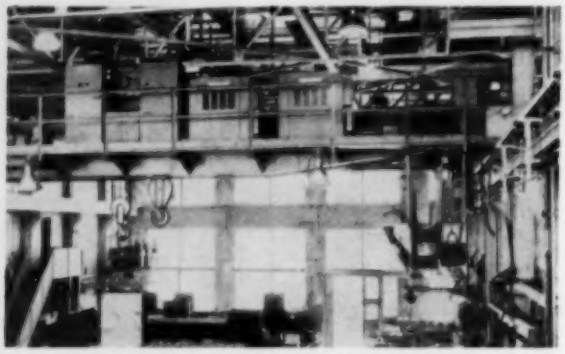
BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company, Coatesville, Pennsylvania



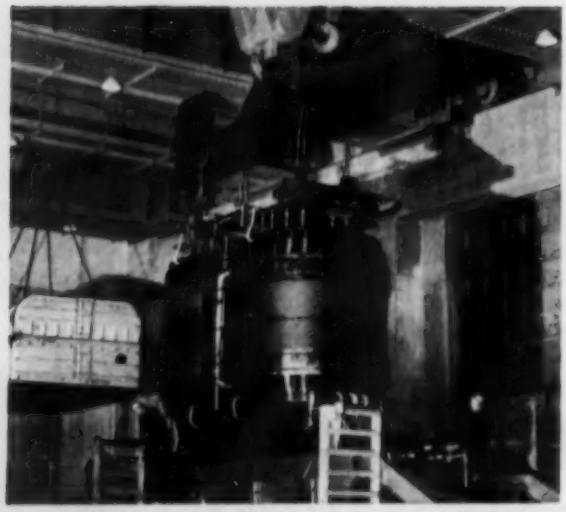
FOR ACCURATE CONTROL OF TRAVELING CRANES such as this one installed at a hydroelectric power station, Type IC7427 provides reversing plugging control.

FOR RAPID HANDLING OF BULK MATERIAL, Type IC7431 provides overspeed protection. Two-motor bucket drives are co-ordinated to reduce required master switch manipulation.

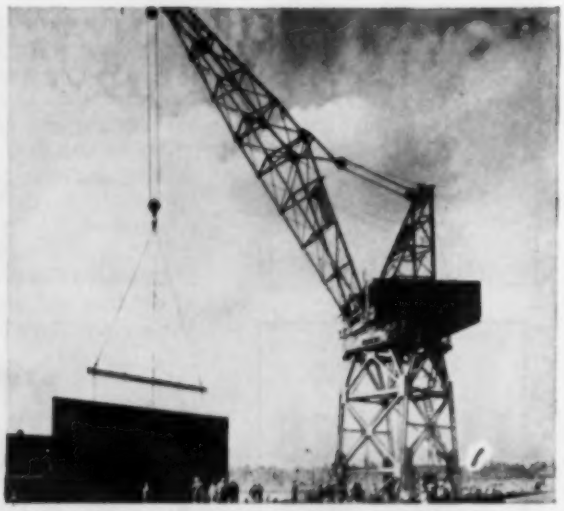


FOR FAST LIFTING, PINPOINT LOWERING, the Speed Variator Hoist Drive is ideal for applications such as this machine shop—provides superior speed characteristics.

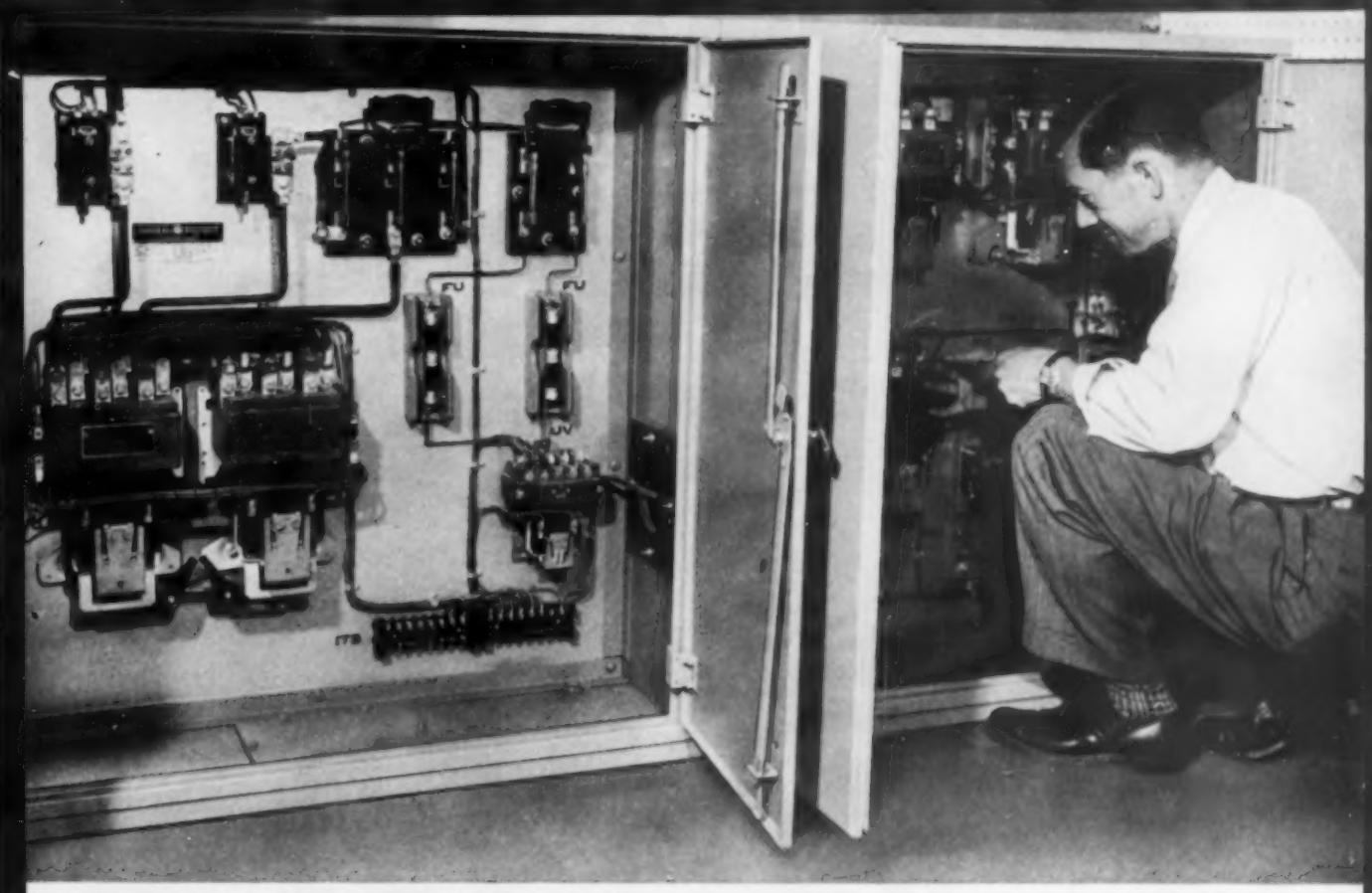
G.E.'s Complete Line of AC Control Gets



FOR STANDBY OR LIGHT-DUTY USE, where distances and speeds are not excessive, type IC7417 is used with a mechanical load brake. Ideal for power plant, warehouse, etc.



HEAVY-DUTY SERVICE AND DELICATE HANDLING are characteristics of the type IC7420, shown here in a shipbuilding yard. This control accurately spots nearly any load.



COMPONENTS ARE STANDARD DEVICES, easily replaceable from stock if ever necessary. Controls for 125 hp or less (440v) are front-wired in low-height, shallow-depth enclosures—permits easy installation of wiring, simplifies device replacement. Large conduit openings on bottom and sides speed wiring of interconnections. Doors swing out 17".

Maximum Performance From Your Crane

Control is "Job-tailored" to each crane

General Electric units are designed to accurately control every bit of power and movement your crane is capable of delivering. Each control in the complete line is "job-tailored" to your crane by experienced G-E engineers working closely with you and your crane manufacturer.

You'll find the *right* control for your application in the complete G-E line. In addition to the forms illustrated, type IC7422 control provides reversing hoist control for eddy current load brakes. Type IC7421 provides reversing hoist control with single-phase dynamic lowering.

Write for complete information on all forms of G-E a-c control, or contact your nearest G-E Apparatus representative.

Section F780-5
General Electric Company
Schenectady 5, N. Y.

Please send me your new bulletin GEA-6112, which gives complete information on G-E a-c crane control.

Name_____

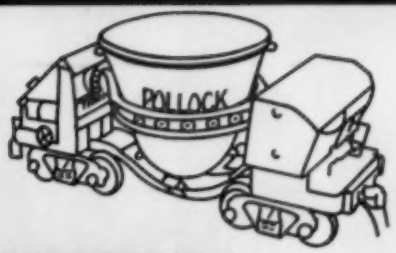
Position_____

Company_____

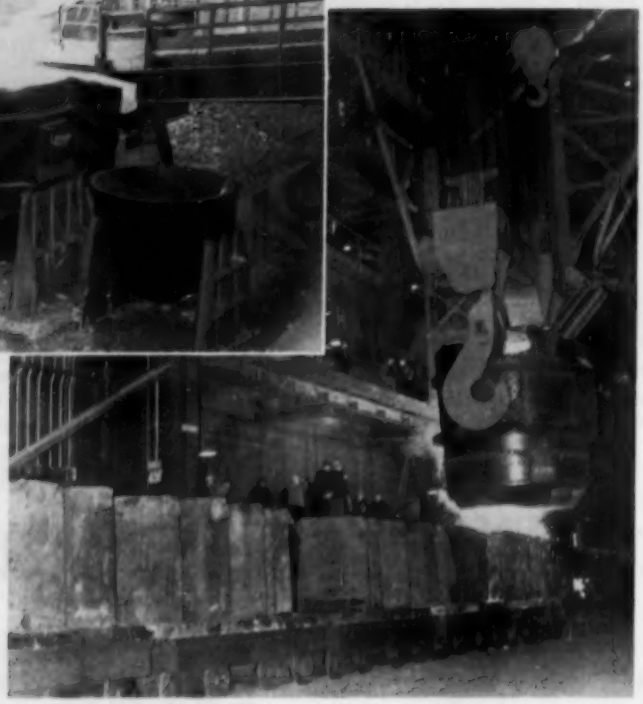
Address_____

GENERAL ELECTRIC

expansion at Portsmouth includes modern Pollock equipment



A 250-ton Pollock ladle, ready to receive the first heat made at Portsmouth's new Open Hearth Shop.



Teeming molten steel from a 250-ton Pollock ladle into ingot moulds at Portsmouth.

Pollock equipment took a prominent part in the pouring of the first heat in the new Open Hearth Shop at the Portsmouth Division of Detroit Steel Corporation. 250-Ton Open Hearth Ladles, 400 Cu. Ft. Self-Dumping Slag Cars and Ladle and Slag Pot Stands are the Pollock equipment ordered by Portsmouth to help provide an increased volume of molten metal to feed its finishing mills.

We at the William B. Pollock Company are proud to be an important supplier to Portsmouth of Open Hearth equipment, and we take great pleasure in congratulating the Detroit Steel Corporation on the progressive steps taken by them to meet current conditions, and we wish them continued success.

POLLOCK
SINCE 1863

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN · OHIO
STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

As is shown here, these stacker teeth are made of 9-foot tubes of USS MAN-TEN Steel tapered from 3 inches in diameter at the large end to 1⅜ inches in diameter at the smaller end. This hollow design, plus the use of light gauges of high strength MAN-TEN Steel keeps the weight of each tooth down to 16 pounds, yet makes them strong enough to stand up under years of work.

How USS MAN-TEN Steel was used to give greater strength and longer life to stacker and rake teeth!

WOODEN TEETH, long used in hay stackers, had many disadvantages for the farmer-user. They would crack easily when snagged on the ground, break under loads of baled hay and warp out of shape from dampness. To give the farmer a better, stronger and longer-wearing product, the Reiten Manufacturing Company, Cooperstown, North Dakota decided to make these teeth of steel. The steel they selected as having the necessary properties to do this job most efficiently was USS MAN-TEN HIGH STRENGTH STEEL.

Now made of USS MAN-TEN Steel, the finished teeth simplify considerably the handling of loose or baled hay. They slip easily under bales, without snagging or catching; they are so much stronger than wood that they can readily stand up under the weight of baled hay without failing; and they wear so much longer and so reduce repairs and replacements that their slightly higher initial cost is offset many times.

USS MAN-TEN—one of the family of outstanding USS High Strength Steels—has a yield point 50% higher than structural carbon steel and it affords high resistance to fatigue, abrasion and impact. As was the case here it can be used to build maximum strength and stamina into vital parts and still keep the weight within reasonable and economical limits – both for the manufacturer and user.

SOON TO BE ISSUED

Our new "Design Manual for High Strength Steels" contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the use of high strength steels. Watch our future advertisements for the announcement of the availability of this important publication.

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS MAN-TEN HIGH Strength STEEL

USS

S-854

UNITED STATES STEEL

"It's the biggest alloy forging

says
Edward Schuerman,
U. S. Steel Hooker Leader

THAT PIECE OF STEEL held by the crane weighs 280,000 pounds. It is 30 inches thick, over 11 feet wide, and 22 feet long. An identical piece lies on the floor. Both will be parts for an extremely large press.

If you are a steel man, you may not be especially impressed by these figures, until you realize that the forgings are made from heat treated alloy steel . . . and the steel for each piece was poured as one heat from a single furnace.

Just *handling* forgings like these is a tough job, a job that falls into the lap of men like Edward Schuerman, Hooker Leader, a U.S. Steel employee for 29 years. He has to choose the correct hook or sling assembly, spot the crane, and supervise the lift. One mistake could delay a shipment by months, but Ed has never dropped a forging in his life.

This is the kind of man who works on every USS Quality Forging. You can put your faith in these men, in the steel that comes from our furnaces, and in the modern equipment that means prompt delivery and highest possible quality.

Write for our free 32-page booklet that describes USS Quality Forgings. Address inquiries or booklet requests to United States Steel, Room 4669, 525 William Penn Place, Pittsburgh 30, Pa.

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL

UNITED STATES STEEL

USS

Quality FORGINGS

- heavy machinery parts—carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- hammer bases and columns

Superior Railway Products Corp. uses Multigrip to *safe-tread* their loading equipment

For safety's sake this "traveling" hydraulic loading platform—in use at The Kirby Storage and Transfer Co., Pittsburgh—is made of Multigrip. The platform travels out to where the truck can be easily loaded, and then travels back.

This portable, adjustable loading ramp is made of Multigrip too. The front leaf only need be raised as one truck leaves and another backs up to the platform.

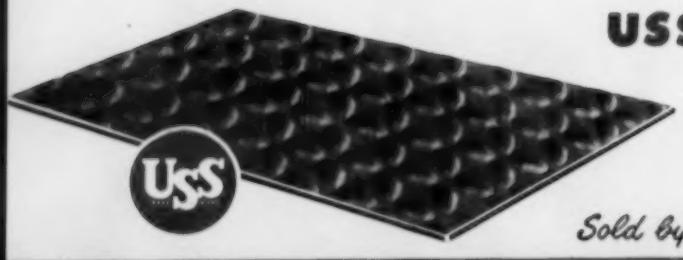
TO BE SURE of maximum traction at all times for busy feet and wheels, Superior Railway Products Corp., of Pittsburgh, have safe-treaded the loading equipment they manufacture (see cuts) with USS Multigrip Floor Plate. Multigrip's sure-grip, never-fail risers prevent accidents from slips and skids (even when it is wet) wherever it is used.

You can install Multigrip with a minimum of trouble and expense for it is easy to cut and bend as necessary; it is available in large sections, reducing cutting waste; and its pattern is symmetrical, making it easy to match the sections. Multigrip lasts for years—it doesn't crack, chip, rot or splinter as other flooring materials do—requires practically no maintenance and is easy to keep clean.

Benefiting from the experience of others, it will pay you to make a careful check of all the potential danger spots in *your* plant or shop. Don't overlook: aisles around machinery, all ramps and stairs, runways and catwalks, warehouse floor and loading areas, and the entire plant floor area too. Multigrip protects your floors as well as your workers . . . all heavy traffic areas should be protected with heavy duty Multigrip for longer life. Can be used as a covering or structurally.

SEE The United States Steel Hour. It's a full hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, CHICAGO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



USS multigrip FLOOR PLATE

Sold by leading distributors from coast to coast S-257

UNITED STATES STEEL

Get Airco Inert-Gas Welding into your Production Picture!

Lower costs through quality and speed . . . that's Airco's answer to your production problem – even when the materials include aluminum, bronze, copper, nickel, stainless steel . . . all engineering metals.

The Aircomatic welding unit, for example, was researched and designed by Airco to produce top-quality welds . . . especially in "problem" metals and alloys without flux . . . with minimum plate edge preparation and little or no preheat. In performance, Airco's Heliwelding is similar – though engineered for high-speed welding of *thin* sections of metals – any metals.

And with the newest Airco addition to inert-gas-shielded welding, Aircospot, you can weld from one side of the joint – eliminating jigs and backup plates. Aircospot is the perfect primary tool for fabrication and no finer cost-saving tool for tack welding has ever been devised.

You'll want to learn more about how Air Reduction's inert-gas-shielded arc welding processes can serve you. Contact your nearby Airco Representative, Authorized Airco Dealer – or write Airco direct.

WELDING SHOW VISIT BOOTH 254

AIRCO®

AIR REDUCTION

60 East 42nd Street • New York 17, N. Y.

Divisions of Air Reduction Company, Incorporated, with offices and dealers in most principal cities

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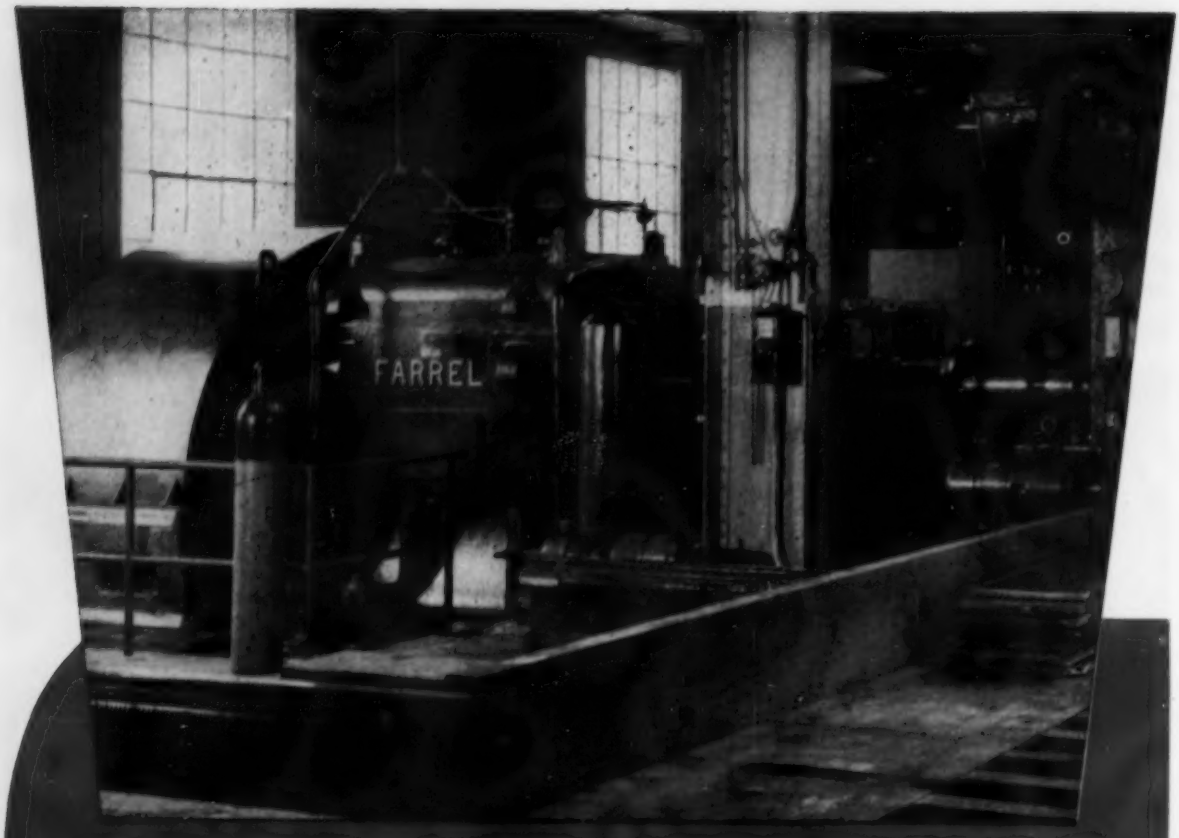
Products of the divisions of Air Reduction Company, Incorporated, include: AIRCO — industrial gases, welding and cutting equipment, and acetylenic chemicals • PURECO — carbon dioxide, liquid-solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • COLTON — polyvinyl acetates, alcohols and other synthetic resins.



GEARS AND BEARINGS LAST LONGER . . .

WHEN YOU USE *Texaco Meropa Lubricant,* with its extraordinary EP characteristics, reduction gears and bearings will be effectively lubricated against wear, effectively protected against corrosion. You'll get smoother operation, longer gear and bearing life, lower maintenance costs.

In the circulating system for your roll necks, turbine-quality *Texaco Regal Oil,* with its outstanding resistance to oxidation and sludging, gives effective protection to oil film bearings, extends the life of your back-up rolls.

A Texaco Lubrication Engineer will gladly explain how effective lubrication — *Texaco* — can reduce costs throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N.Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

TUNE IN: TEXACO STAR THEATER starring DONALD O'CONNOR or JIMMY DURANTE, on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

STEEL
March 21, 1955

Metalworking Outlook

Big Parleys in Labor

Two of the most important labor negotiations of 1955 are scheduled to begin during the week of Apr. 4 (GM and the UAW) and on Apr. 12 (Ford and the UAW). Both companies and the union held preliminary parleys last week to set ground rules. The autoworkers' annual convention begins in Cleveland today. Look for a big emotional appeal by Walter Reuther and other UAW leaders for rank-and-file support of the drive for the guaranteed annual wage.

Consumers Have the Money

The buying public feels better off financially this year than last. A Federal Reserve Board study reports higher income ahead. Consumers plan to spend it on more houses, appliances and furniture. Surprisingly, they don't intend to spend much more for autos, says the report.

$56 Billion for Construction?

Watch for new construction in 1955 to be worth $40 billion, maintenance and repair operations about $16 billion. The $56-billion total compared with $52 billion last year—$37.2 billion for new construction and about $15 billion for maintenance and repair. A survey by Associated General Contractors of America also reveals: Material and equipment prices will remain comparatively stable during the next six months; wage rates will rise; bid prices will continue to decrease.

Estimates Rise on Seaway Traffic

Experts are boosting their estimates of the amount of traffic the St. Lawrence Seaway will carry. Last summer the St. Lawrence Seaway Development Corp. estimated that 36.5 million tons of cargo would be hauled in 1959 and 52 million in 1965, compared with the current annual 10-million-ton movement. Now, Lewis G. Castle, corporation administrator, says: "I believe that traffic in future years will far exceed the estimated potential of 52 million tons for 1965."

Boeing Gets In on Ground Floor

Boeing Airplane Co., Seattle, has been awarded a $460-million Air Force contract to build jet tankers to refuel fighters and bombers in flight. This is more than just another governmental contract. The experience with the tankers will be invaluable in giving Boeing experience to build commercial jet planes. Some observers think it will give the company a marked competitive edge.

Joker in Renegotiation

Some defense contractors may be worse off instead of better by securing exemptions from the Renegotiation Act on their sales of standard com-

Technical Outlook—p. 115 Market Outlook—p. 161

mercial articles. The *Weekly Readjustment Outlook* reports a new ruling by the Internal Revenue Service that affects the situation. Under the IRS decision, contracts and subcontracts over $10,000 for articles purchased under Navy and Air Force specifications and exempt from renegotiation may not be exempt from the Vinson-Trammel Act. V-T limits profits to 10 per cent for vessels and 12 per cent for aircraft. It disallows certain items of expense which are permitted in renegotiation. The President's request to extend the Renegotiation Act "at least until Dec. 31, 1956," comes despite studies that revealed renegotiation administrative costs nearly equal what is recovered. The majority of congressmen want renegotiation; the President bowed to the majority.

Presses: How Big?

Big presses still make news. The latest: Verson Allsteel Press Co.'s 3000-ton hydraulic unit for Colorado Fuel & Iron Corp. CF&I will use the million-pound machine for stamping heavy steel plate heads for pressure vessels up to 3 ft deep and 10 ft in diameter. What's the size limit on presses? "Who knows?" answers President David C. Verson. "If anything, transportation of the machine is the limiting factor. This one alone takes six freight cars."

ASTE Highlight

Hillyer Instrument Co. Inc., New York, revealed one of the most interesting new devices last week at the American Society of Tool Engineers' exposition in Los Angeles. It's a tape control addition to its automatic programming and positioning device. Hillyer demonstrated it with its drilling machine, but it can also be used on many standard or special machine tools. Estimated cost of installing the unit: About $6000.

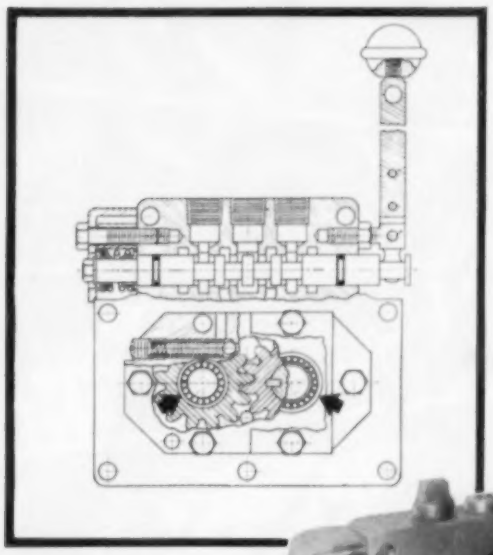
Straws in the Wind

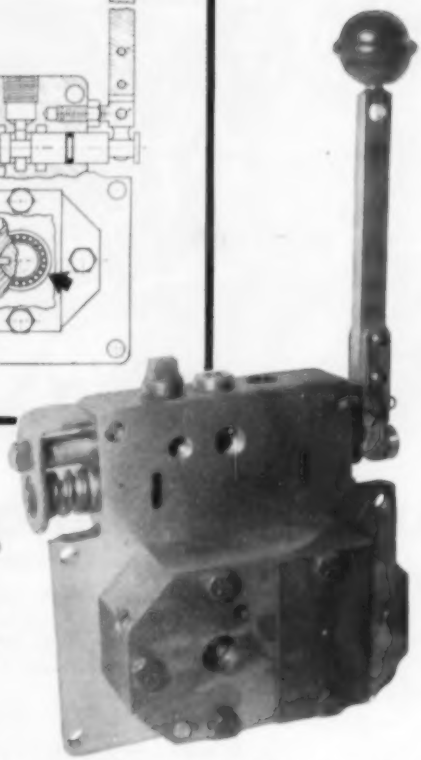
Russia is already having trouble making good on its promise to supply a 1-million-ton steel plant to India for only $91 million . . . Whirlpool Corp. estimates that only 24 per cent of the wired houses in the U.S. have automatic washers, only 7.5 per cent have automatic dryers . . . Corporate wrath is rising as Congress plans to kill Sections 452 and 462 of the 1954 Internal Revenue Code which permit companies to deduct from current income advance payments of future income or reserves set aside for future expenses; Congress had thought the sections would save industry some $50 million yearly, but now finds that the revenue loss on 1954 taxes will be at least $1 billion.

This Week in Metalworking

A big build-up in metalworking inventories is coming (p. 73) . . . How field warehousing can make your inventories do double duty (p. 74) . . . Freight losses cost railroads and truckers about $180 million last year; what did they cost you? (p. 75) . . . Smog costs the nation $1.5 billion a year (p. 76) . . . Capital spending prospects improve (p. 77).

McGILL BEARING BRIEFS





GUIDEROL®

Bearing used in

ENERGY

hydraulic pumps for attachment to farm tractors

OUTWEARS PREVIOUS BEARING 15 to 1

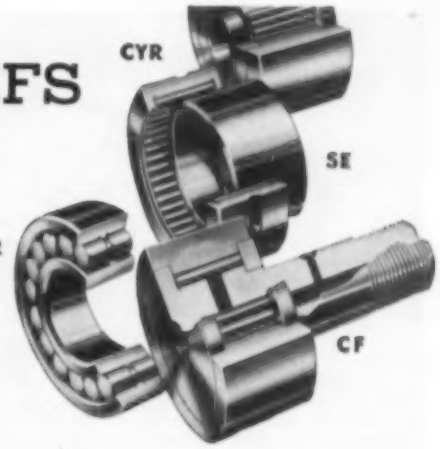
The great load-carrying capacity and the compact size of the Guiderol Bearing are the principal reasons why Energy Farm Equipment Company of Monticello, Iowa, uses the Guiderol for gear support bearings in its hydraulic pump.

Energy reports, "We are one of the largest manufacturers of hydraulic pumps used as attachments to farm tractors . . . Our production is approximately 10,000 units a year and we owe much of our success to the excellent performance of the McGill Bearings used."

The report adds the overall product is improved because closer tolerances can be maintained, maintenance is reduced to zero and length of life is 15 times that of the bronze bearing previously used.

BEARING SELECTION GUIDE

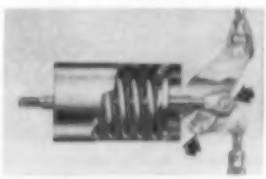
A revised 140 page Bearing Selection Guide, complete with 30 pages of vital engineering data, has been released by the McGill Manufacturing Company. Ask for Catalog No. 52.



MARION HOISTS HANDLE HEAVIER LOADS WITH GUIDEROL® BEARINGS

Marion Heavy-Duty Hydraulic Hoists are built to "handle heavier loads with faster action" while withstanding extreme abuse. Four Guiderol GR-20 Bearings, used as gear support bearings in the pumping mechanism for these dump bodies, have the capacity and dependability for trouble-free operation under these tough operating conditions.

CAREFUL MATERIAL SELECTION DICTATES GUIDEROL® BEARINGS FOR NAVCO COUNTERPOISE HANGERS



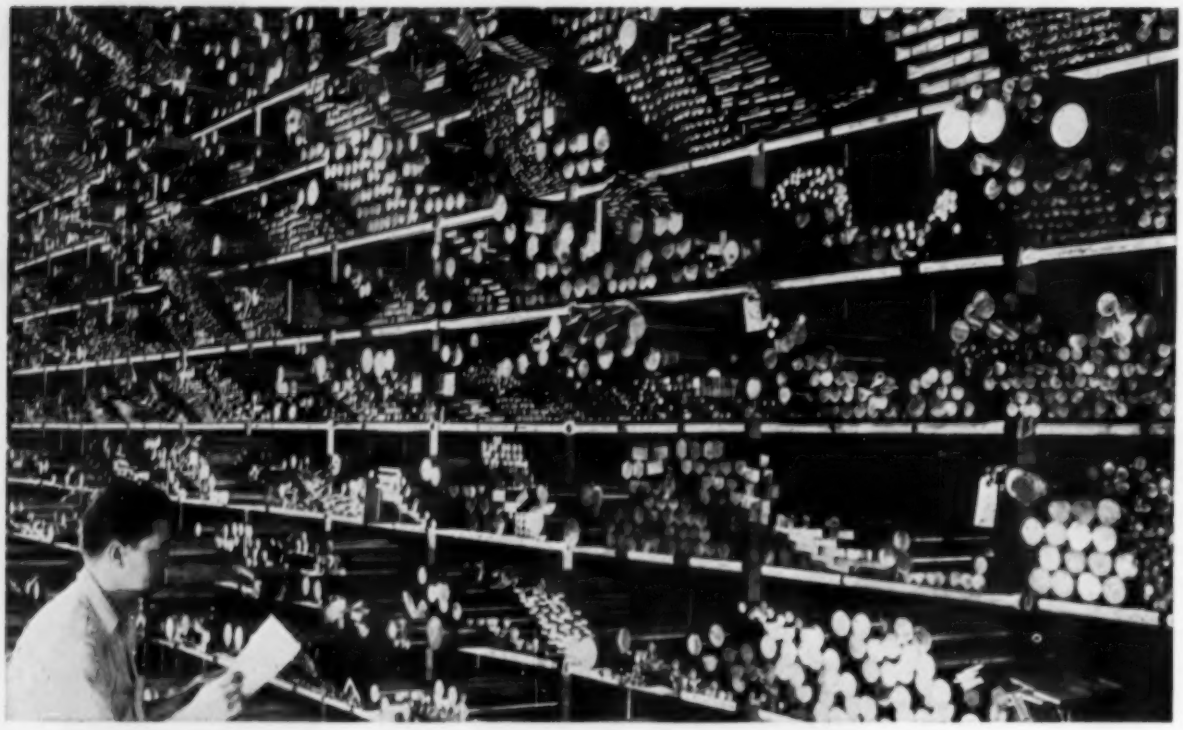
In its Counterpoise pipe hanger, National Valve and Manufacturing Company uses the best and most durable materials to enable it to carry loads up to 16,000 pounds and travels up to 12 inches. The entire hanger is designed to take advantage of the Guiderol capacity and performance.

50th Anniversary

McGILL design leadership has given you these important developments

★ First full-type roller bearing ★ First center guided full-type roller bearing ★ First Cam Follower roller bearing ★ First sealed roller bearing

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA



Here's a STAINLESS "DEPOSIT" that You Can Draw on

Here's stainless steel bar stock ready for your instructions. It's just part of Armco's mill "bank" of finished products. When you can use stock that's on the racks, there's no waiting for the rolling of your order. It's ready now! Just tell us what you need and how you want it shipped.

SEMI-FINISHED STOCK TOO

In addition to finished bar and wire stock, Armco carries a large inventory of semi-finished stainless steel. These blooms, billets and rods are kept for quick conversion into standard and special sizes and shapes.

ALL STANDARD TYPES

Armco produces all standard analyses of stainless steel and special types in a wide range of sizes, forms and finishes. In free-machining types alone there are 11 different bar and wire grades. No other single plant can ship you stainless bars and wire in as wide a range of analyses, forms and conditions.

WHY HOLD UP PRODUCTION?

If you have reasonable quantities of stainless parts to make, we can probably supply you all the bars you need from stock. If your needs are large let us start you out with a stock shipment and follow with a rolling order—so there will be no time lost.

Give us a try! Just note quantities, types and sizes that you require on the attached coupon and mail it to us. We'll tell you promptly what we can do.

ARMCO STEEL CORPORATION
1005 Curtis Street, Middletown, Ohio

Give me price and shipping promise on these items of stainless steel:

Quantity	Type	Size and Finish

NAME:

FIRM:

STREET:

CITY: ZONE: STATE:

ARMCO STEEL CORPORATION 1005 CURTIS ST., MIDDLETOWN, OHIO

SPECIAL STEELS

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • ARMCO INTERNATIONAL CORPORATION

How's Business?

The approach of the second quarter of 1955 makes this an appropriate time to take a fresh look at the prospects for metalworking.

For the bellwether steel industry, March is shaping up as the fourth best month on record. Production of 9.8 million tons will be exceeded only by that of January, March and May of 1953. Outlook for the next few months is good, too. Steel is being bought with confidence as far ahead as July.

The big factor in current activity is the auto industry. It will complete a large part of its 1955 model run by the end of May to meet spring demand—and just in case there's a strike. It's taking 27 per cent of the steel produced and an even bigger bite of some nonferrous metals.

Capital expenditures for new plant and equipment again are heading upward. Included in the planning is more steel and aluminum capacity.

The drop in the stock market is an adjustment largely sparked by the Fulbright investigation. It is not the beginning of a slump.

Secretary Dulles expressed apprehension last week about containing communism without resorting to force. But the U.S. has the necessary superiority in thermonuclear weapons and guided missiles to discourage aggression.

From Congress came the word that "the world situation makes it clear that we must have a strong and expanding economy . . . "

First-half metalworking sales are at the record annual rate of $126 billion. As a whole, 1955 will not turn out that well. There will be a third-quarter let down from the overproduction of the first half, followed by a rise in the fourth quarter.

Despite the second-half adjustments, the year will be second best for metalworking, a $120 billion to $122 billion one, compared with $110 billion for 1954 and $125 billion for 1953.

New figures on population growth provide a glimpse at future markets. On Jan. 1, there were 163.9 million people in the U.S. That's 13.4 million more than five years ago. Another 13 million will be added by 1960.

How's business? Except for scattered ups and downs, it's good and promises to get better!

Irwin H. Such

EDITOR

Bars—Shapes—Plates

immediate delivery from world's largest stocks

You get *all* your requirements in *any* quantity when you call Ryerson for bars, shapes and plates. You also get steel of sound, known quality and steel service know-how that makes your job easier.

Need *bars*? Our stocks are the most diversified as well as the largest and every bar is ordered to a definite spec.—even bars often referred to as "mild steel" are quality controlled to AISI spec. C 1015 for best forming and welding qualities consistent with usual tensile requirements.

Need *structurals*? Here you find the most complete selection, including extra-long lengths. And, you can depend on square, practically burr-less friction saw cutting because of our special method of blade alignment and frequent blade changes.

Need *plates*? You get them here up to 10 inches thick. And shops which have had difficulty forming A-7 quality plates will be glad to know that Ryerson now carries plates of forming and welding quality.

The completeness of these stocks enables you to combine all your carbon steel requirements on one order for lower prices under the Ryerson quantity differential plan and for lower freight rates. So, whether you need a single beam or a carload, call Ryerson for immediate delivery from the world's largest stocks.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

RYERSON CERTIFIED STEELS

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

John Volkert Metal Stampings Inc.

As metalworking optimism mounts . . .

More Inventory Build-up Coming

WATCH for metalworking to rebuild its inventories.

The major reason: The combination of a favorable outlook for general business and record operating levels in automobile and construction industries. Secondary, but still important, factors are the possibilities of war in Formosa and an auto strike, both of which are causing some scare buying.

Components—A STEEL survey of 50 leading component users shows that they started to rebuild inventories three months ago, that they will continue to do so for some time. Their inventory build-up won't be large, but it's only because they are still able to get fast delivery on most items. However, the survey shows inventories on antifriction bearings, electrical parts, some castings and various other supplies are often well below the danger level.

By December of last year, inventory levels had become uncomfortably low for metalworking generally. This year, demands of current business have often been too pressing for industry to rebuild stocks to safe operating levels.

Rebuilding—Last fall, for example, aluminum fabricators were working on a three-week inventory basis. Since then, they have all been trying to satisfy increasing orders and to rebuild inventories to a five-week operating level at the same time. All of them haven't, even though aluminum production is breaking records.

The situation is not the same in all metalworking classifications. Over-all lows in inventories were reached by January of this year. But automobile and building materials retailers had already increased stocks from December, 1954, to the tune of $153 million by the end of January. Steel warehouses, usually among the leaders in any inventory build-up and a sensitive barometer of metalworking business, did not get on the band wagon until three or four weeks ago.

Steel consumers' inventories dropped about 14 million tons from July, 1953, to December, 1954. They reached their low last July. Since then, shipments from the mills have been steadily gaining on consumption. At last count in January, 1955, shipments still fell short of consumption by about 485,000 tons, but they are expected to match this month.

Autos the Key—The industry is still selling cars as fast as it can make them. As of three weeks ago, about 1.5 million units had rolled off the lines this year. About 1.1 million had been sold. Stocks amounted to only an average of 13 cars for each dealer in the U. S., or a backlog of about 24 days at present sales rates.

With the possibility of a strike facing them, automakers are really pushing to build up a protective stock. When the figures are available, they'll probably show that autos took close to 25 per cent of the first quarter's mill shipments of finished steel, compared to the normal 20 per cent.

Effects—Record-breaking operations in autos are making themselves felt in terms of better business for the rest of the economy.

When you add in the normal seasonal order upturn and high operating rates in construction and other barometer industries, it's a safe bet that stocks will be

built up for some time to come.

Last year, metalworking sold more than it produced, digging into inventories. This year, metalworking will produce more than it will sell, building inventories.

Mangaslag Bows Out

Mangaslag Inc. will stop its government-sponsored research for a process to recover manganese from basic open-hearth slag which was to be used to produce standard ferromanganese.

Mangaslag operated a pilot blast furnace in the Lehigh Valley Railroad yard at Coxton, Pa. The company obtained pilot quantities of manganese from slag produced from lake iron ore.

The General Services Administration has engaged the consulting engineering firm of Singmaster & Breyer, New York, to examine the project and make recommendations for the next move. It's expected GSA will try to interest some other contractor in recovering manganese from slag by methods developed by the Bureau of Mines.

Known Oil Reserves Grow

Known reserves of liquid petroleum and natural gas last year—and for the 11th consecutive year—hit new highs, reports the American Petroleum Institute and the American Gas Association.

Liquid petroleum reserves rose to 34.8 billion barrels, a net increase of 422 million barrels. Natural gas reserves climbed to 211.7 trillion cubic feet, a net increase of 263 billion cubic feet.

Commercial Reactors Closer

Private firms will soon be able to build their own atomic reactors.

In line with liberalization of the Atomic Energy Act last year by Congress, the Atomic Energy Commission is planning to release some so-called gray area technology (information classified as confidential). The loosening of information will not affect material in the secret category.

The commission believes that this information is sufficiently detailed to enable private firms to design, develop and operate commercial reactors.

Need operating capital? Field warehousing can help you . . .

Make Inventories Do Double Duty

"I'VE GOT TO HAVE more working capital . . . I'd like to build inventories without tying up cash . . . I want to be sure I'm not going to lose out if one of my distributors goes on the block."

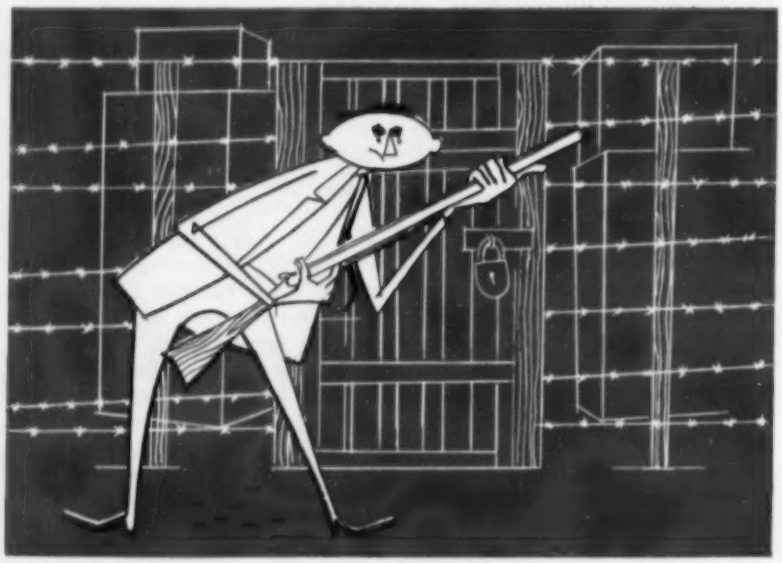
Those problems might be solved with a financial device called field warehousing. Many big metalworking companies use it. A. T. Bear, assistant vice president for Lawrence Warehouse Co., San Francisco, who oversees Ohio activities, reports that air conditioner and refrigerator makers headed up the customer lists last year, with steel suppliers a close second.

Here's How—ABC Co. needs more working capital, and wants to take a loan against part of either its raw materials or product inventory. The field warehousing company (they're in the yellow pages) marks off a suitable storage spot in ABC's plant, checks in the materials and gives ABC a warehouse receipt for loan collateral. ABC can redeem materials as required by repaying the bank and getting a release order. Charges for the service: Rarely more than a fraction of 1 per cent of the total inventory put through the warehouse in any one year.

But field warehousing isn't just a hard-times baby. Mr. Bear reports that business has increased roughly 25 per cent over the last four years because of its increasing popularity for "secured-distribution shipping." This means simply that you can place your goods with your distributors with little or no credit risk, since at no time do you relinquish your title to them.

If the demand for your product is seasonal, this arrangement can really pay off. The cost of financing inventories to be built up on distributors' premises can often be more than offset by leveling out production over the year and retaining a permanent and experienced labor force.

Volume—Mr. Bear has handled transactions involving as much as $12 million. "One thing we've noticed recently," he remarks, "is that a great deal of our metalworking business is being done with companies who want to build up their metals inventories without reducing working capital."



The field warehouse man will put up his fence right in your plant

Scovill Mfg. Co.

You can cut freight losses and damage if you . . .

Pack and Load It Right

FREIGHT CLAIMS cost railroads and truckers about $180 million last year. What did they cost you?

Figuring direct paper work, the time your employees spent settling claims, plus profits never realized from damaged goods, it's probably more than you thought. Damaged shipments don't make customers any friendlier either.

Profits—Carriers spend a lot of time and money on claim prevention. Each claim they pay is an easily measured, out-of-pocket loss. Heavy claims to them can make the difference between a good profit or a poor one—or perhaps none at all.

Your losses aren't so easily measured. But you've got nothing to lose by checking up to see what you can do to cut claims.

Handling—One place to start is your handling of finished products. A study by the National Safe Transit Committee shows that shipments get their roughest treatment in handling, loading and unloading. Some of the damage you think is the carrier's fault may be done right in your own packing and shipping departments. If you're receiving an unwarranted amount of damaged goods, a check of your receiving department might be valuable.

Calling in a carrier's mechanical inspector or claim prevention agent to inspect your loading docks and packing rooms periodically often pays off, says the Chesapeake & Ohio Railway.

Paper Work — Make sure invoices, bills of lading and other paper work are being done properly. Incidentally, on your own purchase orders, show terms of sales and routing of shipments. The Traffic Committee of the Truck Trailer Manufacturers Association says: "We have found that complications arise and losses are sustained by purchasers because of failure to indicate on purchase orders whether transportation costs are to be borne by the vendor or the purchaser."

Another place where shippers can help cut loss and damage, says B. H. Parke of Norwalk Truck Line Co., is to be more particular in checking equipment offered to them by the carrier and refusing to load equipment not suitable for the load.

Packaging—A good spot to cut damage is in packaging. If you suspect your packaging isn't doing the job it should, it may pay you to consult with an outside packaging firm. Its experts often can design you a better package and suggest ways of packaging cheaper, and more effectively.

There are side benefits to good packaging. Hinde & Dauch, Sandusky, O., asks its packaging customers these questions: 1. Does your present package adequately protect your product? 2. Does the package help sell your product? (Perhaps a change in printing, package design or quantity packaged will bring you more sales.) 3. Can the cost of your package be reduced without sacrificing packaging effectiveness? 4. Can the cost of putting the product in the package be reduced by redesign?

Economies—Another plus factor often gained by use of "engineered containers" is in warehousing and handling economies, points out General Box Co., Des Plaines, Ill.

One of the most effective ways to cut freight damage is in preshipment testing. Using procedures developed by the National Safe Transit Committee, some companies have cut shipping losses by as much as 75 per cent. Other companies have made substantial improvements in their products

through elimination of faults found during the tests.

Tests — All Safe Transit tests are for the packaged product—product and container are never tested separately. Tests include 1 hour of vibration, and, depending on the weight of the item, longitudinal impact tests and vertical drops. In the basic carloading test, a loaded freight car is subjected to shocks far in excess of what normally would be encountered. Inspections for damage are made between impacts.

Over 175 manufacturers, plus 37 Safe Transit laboratories, actively participate in the program. Test procedures are available to anyone who requests them.

Benefits—Additional benefits of testing, says the committee, are: 1. Reduced packaging costs—by eliminating guesswork, "extra" packaging is not needed. 2. Better quality control—periodical preshipment testing shows up production bugs. 3. A tool for design engineering — new designs and construction features can be prechecked for "shipability." 4. A sales aid—less shipping damage means more satisfied customers.

Railroads and many truck lines claim that 75 per cent of claims are settled within 30 days of receipt. About 10 per cent are held up because the shipment traveled via several carriers and the amount each one will pay must be worked out. Another 7.5 per cent take further investigation.

Support—An additional 7.5 per cent will never be paid. Some because the damage was clearly the fault of the shipper, but many claims are rejected because they are not supported properly, says the Association of American Railroads.

For speediest processing of claims, the American Trucking Associations Inc. says you need: Bill of lading, paid freight bill and original invoice or a certified copy. In addition, if the loss or damage is noted at the time of delivery, you need a copy of the carrier's acknowledgement of such. For concealed loss or damage claims, you need an inspection report, consignees' form and a shippers' form. In general, the more documents you have to support your claim, the better.

It takes engineering, plus public relations, to curb . . .

Smog Losses: $1.5 Billion Yearly

AFTER sinking $1 billion into its campaign against air pollution over the last five years, industry still isn't sure it can solve the growing problem.

Weldon B. Gibson, Stanford Research Institute, estimates that direct economic losses from air pollution amount to at least $1.5 billion per year in the U. S. This amounts to $10 per person each year, measured in terms of extra cost of cleaning, painting, laundry, damage to merchandise and buildings.

Pat Answers Obsolete — While industry expenditures (estimates range from $100 million to $300 million yearly) look impressive, there is still much to be done, says G. E. Pendray, public relations consultant. Too many industrial managers react to community criticism in a set pattern: 1. The existence of a pollution problem is at first vigorously denied. 2. When irate citizens point to smoke belching from the plant chimney, fly ash or dust, the manager says in most cases: "The plant was here first. Residents must bear the consequences."

Following this approach, the plant will be faced with organized opposition. Meetings, speeches and letters to the editor will commence to give the plant a "black eye."

Smart Approach — To prevent fireworks, says Mr. Pendray, management must: 1. Recognize an air pollution problem when it has one. 2. Act promptly to cure the problem by technological means so far as possible. 3. Tell the public frankly and simply what cures can be effected.

Case in Point — Kaiser Steel Corp. is solving the problem successfully at its Fontana, Calif., installation. When the plant was built in 1942, there were no effective devices for controlling open-hearth and sinter stack emissions. About all the company could do was erect stacks that were higher than usual to get greater dispersion. Two precipitator units have been installed since then, but seven stacks will be uncontrolled until 1958.

Kaiser escaped almost all public attack by simply telling the community what its problems are,

what it is doing about them and what cannot be done. It has invited the public to visit. Good use is being made of newspaper publicity and advertisements to reach those who cannot visit. An air control and research staff is working with university and scientific groups.

Future Requirements — In the future, more money and new devices are going to be needed to combat air pollution. Of first importance: Sound-thinking plant managers who will have the proper answers when citizens demand: "What are you going to do about air pollution at this plant?"

More Steel Expansion

Additional expenditures for new construction projects bolster 1955 prospects

STEELWORKS expansion is gaining. Early estimates of a $695 million expenditure for expansion and modernization in 1955 now appear too conservative.

Reports reaching the Iron & Steel Division, BDSA, indicate some new projects are being undertaken. Others are being enlarged.

Rising Faith—A few reasons for this growing optimism include: Jones & Laughlin Steel Corp. reports that it has approved an additional development program which calls for substantial expenditures. While present plans have about $50 million earmarked for capital improvement, J&L feels that it is quite possible this schedule may be enlarged during 1955.

A $60 million plant expansion and improvement program is being launched by Armco Steel Corp. Additions will involve new facilities in three of the organization's plants.

Another Good Reason—Allis-Chalmers Mfg. Co. and the Crucible Steel Co. of America are "joining hands" to produce silicon steel for the manufacture of electrical transformers. The new steel, to be of the grain-oriented type, will be made at a new, $4.5-million plant to be operated by Crucible at Midland, Pa.

As one firm after another begins to raise its expansion sights, optimism grows.

Brightening: New Plant and Equipment Expenditures

(billions of dollars)

	1955	1954	1953
All industries	27.06	26.83	28.39
Manufacturing	10.70	11.04	12.28
Durable	4.88	5.09	5.82
Nondurable	5.83	5.95	6.46
Mining	.90	.98	1.01
Railroads	.76	.85	1.31
Transportation, other than rail	1.50	1.51	1.46
Public utilities	4.38	4.22	4.55
Commercial and other	8.82	8.23	7.78

Source: Department of Commerce, Securities & Exchange Commission

Plant Expansion Gains Momentum

A decline in capital expenditures which began late in 1953 is expected to end in the second quarter of 1955. Total business may reach $27.06 billion

THE WORM has turned. Three months ago businessmen were predicting to the Department of Commerce and Securities & Exchange Commission that outlays for new plant and equipment would run below the 1954 total of $26.83 billion.

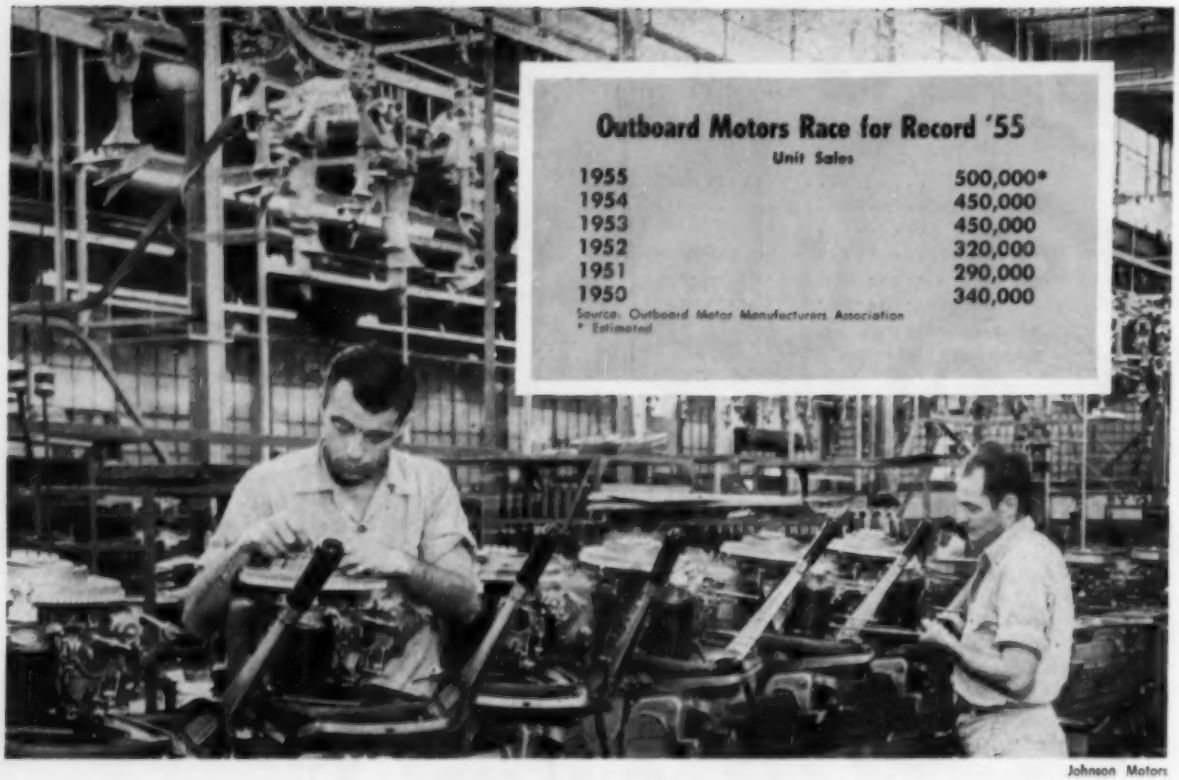
A new report, based on a survey of business anticipations, conducted in February and early March, reveals that total business may reach $27.06 billion in 1955. Capital expenditures (see chart) are expected to turn up in the second quarter of this year, ending a decline which began in late 1953.

Going Up—From the first to the second quarter, spending will rise from a seasonally adjusted annual rate of $26 billion to a rate of about $27.5 billion. In the second half, expenditures will be higher than in the first half in manufacturing, public utilities and nonrail transportation.

Investment programs of public utilities and commercial companies (including communications) show the greatest strength, scheduling increases of 4 and 7 per cent, respectively.

Holding Steady—Manufacturers' programs indicate a 4 per cent reduction in outlays for durable goods and a 2 per cent decrease in nondurable goods. In durable goods a number of industries that reduced their expenditures in 1954 —iron and steel, nonferrous metals and machinery—are now planning increases. The automobile industry, on the other hand, expects to lower capital outlays from the high levels of late 1953 and 1954. Producers of transportation equipment other than automobiles are planning increases. The general trend will be for large manufacturing concerns to match their 1954 capital outlays.

Sales future appears to be bright. Manufacturers are looking for a rise of 4 per cent, trade firms expect a gain of 6 per cent and public utilities foresee an 8 per cent increase over 1954.



Outboard Motors Race for Record '55

Unit Sales	
1955	500,000*
1954	450,000
1953	450,000
1952	320,000
1951	290,000
1950	340,000

Source, Outboard Motor Manufacturers Association
* Estimated

Johnson Motors

Outboard motor sales of 500,000 this year will mean . . .

Big Splash for Metalworking

OUTBOARD motormakers are churning up campaigns to sell a record 500,000 motors this year.

Traditionally, outboards have been noisy rascals but the big noise today in the industry's sales campaign is the silence of its motors. It's one of the features that's making this $107-million industry tougher competition for the "after-expenses" family dollar that might otherwise go for a second auto or a new appliance.

Target—Sales last year (see table) kept pace with the high point reached in 1953. Leading manufacturers are sure the record will topple this year: Johnson Motors, Waukegan, Ill., plans a 10-per-cent production hike this year over last; Scott-Atwater Mfg. Co. Inc., Minneapolis, which had a 40-per-cent increase in 1954 over 1953, expects this year to be its biggest; Evinrude Motors, Milwaukee, is shooting for a 22-per-cent gain, the same as it enjoyed last year over 1953. Both Evinrude and Johnson are divisions of Outboard, Marine & Mfg. Co., Waukegan, Ill.

The boat people are sailing pretty, too. Outboard boat officials tagged last year's sales at about $87 million. Although most boats are constructed of wood, aluminum is scoring good gains. An estimated 30 per cent of the boats built last year were aluminum.

No longer strictly a fisherman's convenience to get to a favorite reed patch, outboard motor boating is becoming a sport unto itself —one the whole family can enjoy. Helping to boost the dollar volume is the trend toward higher horsepower motors.

Like Autos, Faster—In 1949, 68 per cent of the motors sold were in the under-7-horsepower class, only 4 per cent were over 12 horsepower, according to the Outboard Motor Manufacturers Association. Last year under - 7 - horsepower sales dropped to 43 per cent of the total; over - 12 - horsepower sales jumped to 21 per cent.

On a tonnage basis, the metals used in the production of motors run approximately 60 per cent aluminum, 38 per cent steel and 2 per cent copper.

The Industry—About a dozen companies are in the outboard motor manufacturing business. Some produce a full range of motor sizes. Others, like Muncie Gear Works, Muncie, Ind., specialize in one. It makes a 1.7 horsepower motor. The newcomer to the industry is Oliver Corp., the farm equipment producer which bought the outboard facilities of Chris-Craft Corp., in Battle Creek, Mich.

Still More—The long-range outlook for the industry is good, too. Spokesmen point to: More leisure time, greater acceptance of the sport by women, development of more man-made lakes, rise in water sport participation like skiing and better boating facilities.

What to do when an employee repeatedly says . . .

"I Missed the 7:22"

JOE CARELESS almost became Joe Jobless. Joe Careless came to work 5 to 10 minutes late every day. It seemed insignificant, but management, looking at the records of thousands of such people, saw hundreds of lost man-hours. Joe's pay was docked. Now he shows up on time.

Management is being forced to take a closer look at absenteeism and tardiness. The National Industrial Conference Board reports that a survey of almost 500 companies shows that 28.3 per cent of the firms reporting state that they now drop a man from the payroll after three days of absence without notice—67.6 per cent drop workers after one week.

Paper Work—There is a trend for large companies to have an elaborate system of checks and controls. They call for cumulative reports and follow-through, development of adequate health and medical programs of a preventative nature and careful screening of new employees. They're placed in departments best suited to them.

Cost High—Most medium and small firms feel that the paper work entailed in checking absenteeism and tardiness is too costly —that the money and effort expended are not commensurate with results. Yet, there is a definite awareness that lost time means lost revenue.

Research points to the foreman as the man to remedy the situation. To the rank and file, the foreman (or supervisor) is the boss. A survey by the Bureau of National Affairs Inc., Washington, reveals that only 45 per cent of the larger companies and 35 per cent of the smaller ones give their foremen special training on the proper handling of absenteeism.

One Bright Spot—Union help is frequently obtained through collective bargaining agreements. Admonitory talks by union representatives with chronic absentees and refusal to defend habitual offenders when disciplined by the company are often included.

Health and accidents, the main causes for lost time, should be carefully considered by the organization attempting to cut costs. There is a definite need for providing the best possible programs for treatment so that a worker is not away from his duties longer than necessary.

Record Keeping — There are many ways to keep records on absenteeism and tardiness. The National Conference Board, New York, points out that some companies do not even bother to compute an absence rate, although they may keep fairly detailed absence records which enable them to watch for trends and variations in their own data. Other systems reported by the Board include: 1. Total number of man-days lost is divided by the total man-days scheduled, times 100. 2. Total number of days lost is divided by number of workers. 3. A figure showing absenteeism costs as a percentage of total payroll expenses is compiled.

These reports can often provide an insight into company morale. It also enables management not only to keep track of absenteeism and tardiness within its own organization, but gives some measure of comparison between its lost time performance and general economic trends.

A Safe Place To Work

The iron and steel industry was one of the safest in which to work in 1954.

Based on reports of companies representing 95.7 per cent of total steel output, the industry had a new low rate of 3.85 lost-time accidents per million man-hours worked. That's 19 per cent better than the previous low of 4.75 in 1953.

Accidents in 1954 proved less severe, too. The severity rate was down to 0.87 days per million man-hours worked, or 20 per cent less than the 1.08 in 1953.

Management agrees: Docking a worker's pay for being late usually brings improvement in the tardiness problem. It helps reduce absenteeism, too

River Toll Proposal Attacked as Threat To Inland Development

■ INLAND waterways in America have been traditionally free. The National government in the ordinance of 1787 provided they "shall be common highways, and forever free . . . without any tax, impost or duty." The first Congress enacted the ordinance without change. Later acts of the federal government reaffirmed the policy.

So strong has been the doctrine that various proposals to make river shippers pay tolls or user charges have come to naught.

But policies and doctrines change. This spring will bring forth a new proposal to impose tolls on the inland waterways. Its backing (and opposition) will be powerful. Result: Loud political fireworks.

Revenue Measure—Expected to recommend tolls as a source of revenue are such groups as the cabinet committee on transportation, comprised of Commerce Secretary Weeks, Defense Secretary Wilson and Defense Mobilizer Flemming. The Water Resources task force of the Hoover Commission, headed by Adm. Ben Moreell, Jones & Laughlin chairman, may support the proposal. Railroads, of course, will back river tolls.

Now rallying to oppose the move are the communities owing their development to inland water transportation and industries located on the waterways. Most affected are the bulk commodities, such as coal and coke, iron and steel, chemicals and sulphur, sand and gravel and oil and gasoline.

River traffic on the Ohio alone amounts to 12 billion ton miles yearly. That represents a threefold increase over 1940 and an eightfold increase over 1930.

Arguments in Opposition — Opponents of the toll proposal believe the charges would disrupt the established industrial pattern in the Ohio, Mississippi and other navigable river valleys. They contend the toll system would increase water transport rates to a point where river movement of bulk commodities would become unfeasible. They charge a toll system would create dislocations that would result in the abandonment of industrial installations and threaten the continued development of the river valleys.

The proposal has not been brought out in the open, but already pressure on congressmen is mounting.

Meet Harold Erskine: Director of the Aluminum & Magnesium Division, Business & Defense Services Administration, Mr. Erskine is on loan to the government from Aluminum Co. of America. He succeeds George Perkins, Reynolds Metals Co., under the rotation system—business personnel volunteer their services for six months or longer without cost to the government. Mr. Erskine is assistant general manager of Alcoa's castings division and is former manager of Alcoa's Cleveland plants.

In Washington, he is in the Commerce building, room 4807. Telephone Sterling 3-9200, Ext. 4437.

Defense Spending Level

■ Whatever ups or downs the economy encounters in the next year and a half will depend on civilian production and consumption. Defense spending for hard goods will fluctuate little.

Hard goods expenditures will continue at about the last-half, 1954 rate through fiscal 1956. The rate will be slightly under $4 billion a quarter.

Aircraft will continue strong—about $7.5 billion in both 1955 and 1956. Ships will take $900 million in 1955 and will rise slightly in 1956. The improvement will continue in later years.

Combat and support vehicles will be down. Ammunition spending will drop, except for guided missiles which will rise sharply.

Electronics will be up gradually. Research and development spending will rise. Civilian components will be stable.

Uncle Sam Goes to Fairs

■ American manufacturers and the United States government will participate more actively in foreign trade fairs this year. The government is undertaking a real sales promotional job to cultivate foreign trade. Trade fair activity also will help counteract Russian propaganda in the cold war.

Governmental exhibits will be staged at Verona, Utrecht, Milan, Lyons, Brussels, Liege, Hanover, Valencia, London, Paris, Palermo, Barcelona, Berlin, Vienna, Tokyo, Karachi, Jokyakarta, New Delhi, Izmir, Zagreb, Salonika, Addis Ababa and Damascus. At other fairs, the United States will be represented by marketing teams.

Metalworking companies wanting more information on trade fair program may write: Trade Information Center, Department of Commerce, Washington 25.

WASH THAT DIRTY STRIP
BEFORE SHEARING and BLANKING

McKAY
PRESS FEED AND CUT-UP LINES

The latest development in McKay coil feed lines is this new strip washing machine which thoroughly cleans the strip after it leaves the coil and before it passes through any subsequent feed rolls.

In most stamping plants a sizeable portion of metal finishing costs and quality control problems can be traced to the fact that some coiled steel is dirty and much of this dirt picks up on the rolls of the processing equipment. The dirt which carries over on the blanks may cause scratches in the drawn panels during the forming operations.

In several recent installations McKay has furnished a strip washing machine which utilizes high speed brushes and large volume solvent sprays to thoroughly clean the steel strip at high production speed.

CONSULT McKAY ENGINEERS IF YOU HAVE A PRESS OR SHEAR FEEDING PROBLEM. WE INVITE YOUR INQUIRIES.

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

BALANCED TO YOUR NEEDS

J&L STEEL

quality forging steels

Machinability, forgeability and heat treating properties—these are the steel qualities that must be balanced correctly to cut your operating costs and improve finished part quality.

At J&L strict metallurgical control of every operation from ore mine to finishing mill assures production of forging steels with the exact balance of properties you require.

In addition, J&L is prepared to help establish the particular specifications that give you the most desirable results. J&L's staff of experienced metallurgists is available to analyze your requirements.

Whether you are producing rugged, heavy-duty forgings or lightweight, high-strength parts, you'll find it profitable to use J&L steels.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

France Promotes Itself In the U.S.

Realistic program goes long way toward establishing French products in American market place. Look for French salesmen to be calling on U.S. buyers in hinterlands

FRANCE'S Franc-Dollar Committee proves a small investment in sales promotion can reap big investments in increased exports—if it's done properly. It could serve as a model for American businessmen eying foreign markets.

The committee was formed in 1950 to help increase French dollar holdings by fostering more exports to Canada and the U. S.

Cost and Effect—Annual activities of the committee cost about $358,000. At the same time, French exports to the American market have increased steadily from $171 million in 1950 to $226 million in 1952 to $247 million in 1953. The Franc-Dollar Committee cannot claim full credit. But it has aided significantly.

Says Jean-Jacques Guerlain, president of the committee's board: "Many sectors of French industry which were not previously exporting to the American market have begun to do so, and some of them have now attained a substantial volume of sales. . . ."

The Way of It—How does the committee function? Sponsored by the French government and the Federation of French Industries, its services are available to companies seeking to crack the American market. The committee organizes special exhibitions of products in the U. S. before buyers and importers. During 1953-54, 500 French firms exhibited.

Also, the committee maintains a reception and information center in Paris for exporters and American buyers. The committee will sometimes undertake a market survey to determine a product's sales potential in a given area.

Third Arm — The committee helps businessmen arrange for their trips to the American continent and makes official and business appointments for them.

Finally, the committee is conducting an information program for the American public on France and its products. This campaign is not canned in France and shipped to this country. It's made up here with the help of American public relations experts.

Paris to Paducah—One of the fundamental strengths of the committee's program is its insistence on grass roots activity. Said the committee's executive secretary, Bertrand Hommey, after a reconnaissance trip to this country: "Across the American continent there are rapidly growing cities where enormous purchasing power is concentrated . . . citizens and professional buyers are no longer going even as far as New York to do their buying. We must send salesmen across America, and, by planned advertising and promotional campaigns, reach the American public that would like to buy our products if they were known and available to them."

Mr. Guerlain isn't satisfied with the present level of French exports in the U.S. The goal is $500 to $600 million annually. And, says he: "We are convinced that this goal can be eventually attained . . ."

If this sort of program works for French exports to the American market, why can't it improve U.S. exports to foreign markets?

British Imports Jump

British demand for steel in England during January, 1955, resulted in a sharp jump in imports, mostly from the U.S. Steel imports totaled 76,256 tons in January, 1955, compared with 73,095 tons in December, 1954. More than one-third of the January total was supplied by the U. S. Uncoated sheet imports reached 29,016 in January, compared with 21,138 tons in December, 1954. The U.S. supplied well over one-half of those sheets.

ECSC O.K.'s Russian Pig Iron

The High Authority of the European Coal & Steel Community advised the government of Belgium that the proposed import of 7500 tons of Russian pig iron was not contrary to its (ECSC's) treaty, considering the present situation in the pig iron market. But, said the High Authority, this decision does not bind the ECSC on similar deals in the future.

British Wings for America's Skies

Britain's famed Vickers aircraft plant at Hurn has turned to foreign countries to market its Viscount propeller-turbine planes. Canada and the United States are getting a goodly number of them. Capital Airlines in Washington recently bought 20 more planes, bringing its total order to 60. Trans-Canada Airlines has ordered 22 Viscounts, some of which are shown under construction at Hurn

Where Finished Steel Went in 1954

Auto industry continues to be a big wheel in consumption, but the container industry packs a lot of weight, too

THE automobile industry gets a lot of credit for being a big wheel in steel consumption. But did you know that little things like containers take half as much steel as autos?

Figures just released by the American Iron & Steel Institute for 1954 show that while the auto industry was taking 18.67 per cent of the mill shipments of finished steel, containers were getting 9.30 per cent.

First and Third—The auto and container industries were first and third in size as consumers of steel, the same positions they held in 1953. The container industry actually strengthened its hold on third place in 1954. In 1953 it received only 7.55 per cent of mill shipments of finished steel. The auto industry went up from 1953's 18.30 per cent.

Continuing in second place as a steel consumer is the construction and maintenance industry, a strong pillar in the 1954 economy. Its importance is borne out by its take of steel—13.67 per cent of mill shipments, a rise from 1953's 12.38 per cent.

A Change—Last year was a slow one for the steel industry. Consumers lived off inventories, buying less steel than they used. This easing of demand shows up in a reduced take of steel by converters and processors. When all sorts of steel conversion was under way in 1953 to satisfy demand, converters and processors received 4.38 per cent of mill shipments. In 1954, they took only 3.89 per cent.

With our steel business slow in 1954 while foreign countries were beginning to pick up, we raised our exports to 4.01 per cent of mill shipments of steel.

DISTRIBUTION OF FINISHED STEEL BY

Net tons of mill shipments of all grades, including alloy and stainless.

Market Classification	Ingots, Blooms, Billets, Slabs, Sheet Bars, and Seamless Tube Rounds	Skelp	Wire Rods	Structural Shapes (heavy)	Steel Piling	Plates	Standard Rails (over 60 lb)	Rails (all other)	Joint Bars	Tie Plates
Converters, Processors	362,657	84,653	317,171	607	.....	67,558	149	59	2,528	43
Forgings (except automotive)	479,697	.....	439	.....	.....	13,489	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	18,843	.....	245,879	.....	.....	1,053	.....	.....	.....	.....
Jobbers, Dealers, Distributors	17,280	73	10,057	904,750	21,458	702,754	3,164	10,021	864	555
Construction, Maintenance	67,304	113	20,928	2,634,571	318,569	1,595,831	27,133	26,198	3,128	4,490
Contractors' Products	2,282	.....	26,076	19,963	.....	174,493	.....	.....	.....	.....
Automotive	368,875	.....	24,342	32,847	.....	309,249	.....	.....	.....	.....
Rail Transportation	13,907	.....	1	187,635	205	346,581	977,933	16,684	53,530	222,815
Shipbuilding, Marine Equipment	3,005	.....	39	88,212	2,794	314,289	7,409	310	2	7
Aircraft	13,434	.....	4	2,902	.....	10,051	.....	.....	.....	.....
Oil and Gas Drilling	26,391	.....	.....	35,497	1,456	51,498	.....	.....	.....	.....
Mining, Quarrying, Lumbering	3,042	.....	9	21,598	1,483	46,333	14,319	8,178	659	2,263
Agricultural	15,814	.....	5,347	43,568	.....	93,529	.....	.....	.....	.....
Machinery, Industrial Equip., Tools	101,658	.....	64,658	230,557	17	1,086,496	2,136	3,079	90	1
Electrical Machinery and Equipment	1,423	.....	21,800	25,551	.....	146,589	.....	.....	.....	.....
Appliances, Utensils, Cutlery	—45	.....	78	3,059	.....	8,286	.....	.....	.....	.....
Other Domestic, Commercial Equipment	927	.....	9,653	5,248	.....	22,198	.....	.....	.....	.....
Containers	4,193	.....	763	750	.....	41,879	.....	.....	.....	.....
Ordnance and Other Military	313,433	.....	48	5,870	10	169,232	.....	731	17	.....
Export	21,866	44,840	13,446	257,990	41,662	136,612	81,123	15,784	3,287	5,837
Unclassified	10,703	.....	147	8	.....	2,262	.....	2,533	199	.....
Total	1,846,689	129,679	760,885	4,501,183	387,654	5,340,262	1,113,366	83,577	64,304	236,011

Market Classification	Mechanical Tubing	Pressure Tubing	Wire, Drawn	Nails and Staples	Wire, Barbed and Twisted	Woven Wire Fence	Bale Ties	Black Plate	Tin and Terne Plate (hot-dipped)	Tin and Terne Plate (electrolytic)
Converters, Processors	2,654	1,146	795,698	566	38	505	73	5,191	130	1,025
Forgings (except automotive)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	.....	.....	215,827	.....	.....	.....	.....	848	.....	.....
Jobbers, Dealers, Distributors	110,380	65,887	264,309	536,621	128,948	292,320	49,522	72,168	47,173	93,116
Construction, Maintenance	18,715	14,703	46,887	5,139	731	3,633	306	6,490	2,501	3,511
Contractors' Products	32,365	13,204	71,794	818	.....	52	.....	17,504	1,722	2,551
Automotive	143,632	7,709	214,950	410	.....	.....	.....	12,510	1,434	16,489
Rail Transportation	1,574	1,127	875	2,827	1,228	1,872	.....	172	416	115
Shipbuilding, Marine Equipment	52	15,875	365	24	1	6	.....	.....	.....	9
Aircraft	5,355	167	939	25	.....	.....	.....	.....	522	276
Oil and Gas Drilling	13,099	1,834	249	10	.....	.....	.....	2	50	1
Mining, Quarrying, Lumbering	1,074	74	506	177	1	85	.....	121	.....	.....
Agricultural	21,382	97	11,348	192	29	80	.....	566	69	667
Machinery, Industrial Equip., Tools	158,296	48,413	194,142	2,827	.....	.....	.....	4,526	2,230	12,777
Electrical Machinery and Equipment	10,697	2,222	62,105	363	.....	.....	.....	3,016	1,843	2,066
Appliances, Utensils, Cutlery	8,579	6,096	44,555	153	.....	.....	.....	54,689	5,703	14,222
Other Domestic, Commercial Equipment	33,707	31	312,745	828	.....	.....	.....	77,684	6,585	7,622
Containers	3,176	.....	92,965	6,160	21	.....	1,482	369,788	841,713	3,260,463
Ordnance and Other Military	24,702	498	8,787	928	2	2	1	118	8,213	297
Export	9,245	4,375	30,971	1,402	1,347	1,362	365	47,410	386,792	265,260
Unclassified	75,630	93,750	50,965	7,912	.....	.....	.....	.....	.....	.....
Total	674,214	277,208	2,420,982	567,382	132,346	299,917	51,749	672,803	1,307,096	3,680,467

Exports in 1953 were 3.34 per cent.

Proof—The doldrums of the rail transportation and shipbuilding industry are reflected in a reduced take of steel. In 1954, rail transportation took 3.89 per cent of mill shipments, compared with 5.97 per cent in 1953. Shipbuilders took only 0.79 per cent in 1954, compared with 1.09 per cent the year before. Ordnance and other military uses required only 1.53 per cent of mills' shipments of finished steel in 1954. In 1953, that classification took 3.36 per cent.

Although the automobile industry is the largest user of steel, it is outranked as a buyer by jobbers, dealers and distributors, commonly known as the steel warehouse industry. Jobbers, dealers and distributors received 19 per cent of the steel shipped by mills in 1954 compared to 1953's 18.56 per cent.

Leader—Leading product in 1954's mill shipments was cold-rolled sheets. They comprised 15.2 per cent of the output. The auto industry took over half.

Where Alloy, Stainless Steel Went

(Mill Shipments in 1954)

	Alloy, other than stainless —net tons—	Stainless —net tons—
Converters, Processors	58,537	30,002
Forgings (except automotive)	341,916	8,678
Bolts, Nuts, Rivets, Screws	46,561	6,480
Jobbers, Dealers, Distributors	419,793	123,276
Construction, Maintenance	67,260	5,059
Contractors' Products	13,060	9,337
Automotive	1,297,244	86,303
Rail Transportation	70,566	4,688
Shipbuilding, Marine Equipment	58,104	1,537
Aircraft	38,638	18,600
Oil and Gas Drilling	134,946	592
Mining, Quarrying, Lumbering	13,540	249
Agricultural	27,053	389
Machinery, Industrial Equip., Tools	385,274	29,051
Electrical Machinery and Equipment	407,228	7,131
Appliances, Utensils, Cutlery	19,342	31,914
Other Domestic, Commercial Equipment	16,537	11,488
Containers	17,444	1,610
Ordnance and Other Military	113,631	3,559
Export	105,778	16,603
Unclassified	113,300	55,805
Total	3,768,753	453,351

• Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Building, Cleveland 13, Ohio.

MARKET CLASSIFICATION DURING 1954

Tables compiled by STEEL from American Iron & Steel Institute figures

Track Spikes	Wheels	Axles	Bars, Hot-Rolled (and light shapes)	Bars, Concrete Reinforcing	Bars, Cold-Finished	Bars, Tool Steel	Standard Pipe	Oil Country Goods	Line Pipe	Market Classification
170	.....	.....	179,483	9,775	583	259	23,241	3,962	3,294	Converters, Processors
.....	.....	.....	334,228	.....	4,212	811	.....	.....	.....	Forgings (except automotive)
.....	.....	.....	365,519	.....	50,849	46	.....	.....	.....	Bolts, Nuts, Rivets, Screws
4,070	11	.....	939,725	659,710	241,525	14,126	1,677,261	1,875,198	719,380	Jobbers, Dealers, Distributors
1,309	3,304	817	571,217	896,697	3,395	132	131,261	23,786	1,526,767	Construction, Maintenance
.....	.....	.....	175,194	26,202	14,210	21	147,994	.....	12,003	Contractors' Products
.....	.....	.....	1,836,331	.....	331,980	316	4,139	.....	156	Automotive
58,546	175,445	56,947	150,091	1,224	3,314	18	3,608	.....	505	Rail Transportation
.....	82	.....	30,224	26	4,200	16	4,629	.....	7,759	Shipbuilding, Marine Equipment
.....	.....	.....	17,825	.....	10,418	97	290	.....	1,050	Aircraft
.....	168	.....	123,083	155	6,722	.....	8,694	269,751	34,596	Oil and Gas Drilling
557	1,160	154	66,442	6,651	3,095	500	1,786	128	2,616	Mining, Quarrying, Lumbering
.....	.....	.....	348,872	140	60,587	13	28,615	.....	1,622	Agricultural
34	7,769	432	613,037	314	254,502	11,705	35,895	.....	28,198	Machinery, Industrial Equip., Tools
.....	20	24	107,487	.....	32,628	90	179,542	.....	4,001	Electrical Machinery and Equipment
.....	.....	.....	13,626	.....	30,219	47	6,906	.....	65	Appliances, Utensils, Cutlery
.....	.....	.....	79,250	64	31,115	87	7,000	.....	441	Other Domestic, Commercial Equipment
.....	.....	.....	7,059	.....	410	.....	3,504	.....	294	Containers
6	69	2	124,372	.....	80,195	13	2,136	.....	148	Ordnance and Other Military
916	4,455	2,580	53,898	36,326	5,518	170	53,764	118,351	198,579	Export
.....	.....	.....	118,502	113,673	40,596	55,676	.....	.....	54,399	Unclassified
65,608	192,483	60,956	6,255,465	1,750,957	1,210,273	84,143	2,320,265	2,291,176	2,594,873	Total

Sheets, Hot-Rolled	Sheets, Cold-Rolled	Sheets, Galvanized	Sheets, Coated (all other)	Sheets, Enameling	Sheets and Strip, Electrical	Strip, Hot-Rolled	Strip, Cold-Rolled	Net Total	Per Cent of Total	Market Classification
236,917	142,625	38,258	835	259	1	133,449	38,141	2,452,703	3.89	Converters, Processors
.....	.....	.....	.....	.....	.....	.....	.....	832,876	1.32	Forgings (except automotive)
44,871	2,853	348	.....	.....	.....	3,389	12,247	962,572	1.53	Bolts, Nuts, Rivets, Screws
647,613	913,829	801,146	20,701	2,653	4,365	93,924	52,813	11,999,470	19.00	Jobbers, Dealers, Distributors
341,258	109,207	130,278	1,426	1,404	.....	71,851	19,997	8,634,987	13.67	Construction, Maintenance
651,311	664,986	682,131	7,630	24,707	1,644	75,565	123,490	2,969,812	4.70	Contractors' Products
2,317,758	4,994,109	50,692	105,845	1,552	8,362	625,187	384,115	11,792,989	18.67	Automotive
121,595	13,444	20,856	52	104	6,379	12,306	3,366	2,457,297	3.89	Rail Transportation
9,658	2,515	6,626	1,222	702	38	935	200	501,231	0.79	Shipbuilding, Marine Equipment
6,655	10,244	1,776	957	.....	891	728	4,242	88,848	0.14	Aircraft
7,460	2,562	775	.....	55	91	1,139	224	585,562	0.93	Oil and Gas Drilling
8,986	2,262	969	13	8	124	5,426	825	201,624	0.32	Mining, Quarrying, Lumbering
171,973	57,486	245,559	2,171	1,028	295	73,122	5,028	1,189,199	1.88	Agricultural
335,617	137,432	23,522	3,057	335	3,094	84,577	65,615	3,517,038	5.57	Machinery, Industrial Equip., Tools
174,047	271,912	32,931	9,193	5,871	478,913	56,747	107,926	1,739,007	2.75	Electrical Machinery and Equipment
134,679	758,275	79,512	11,389	126,478	17,392	13,567	103,931	1,441,461	2.28	Appliances, Utensils, Cutlery
123,937	742,927	47,723	5,082	7,829	4,006	46,584	168,817	1,742,090	2.76	Other Domestic, Commercial Equipment
490,672	430,967	48,156	930	75	.....	161,999	103,199	5,870,618	9.30	Containers
135,248	53,892	3,427	403	23	374	4,740	26,503	964,440	1.53	Ordnance and Other Military
131,943	294,162	147,947	8,055	7,135	62,882	20,906	15,320	2,533,883	4.01	Export
2,070	.....	.....	.....	.....	.....	.....	45,994	675,019	1.07	Unclassified
6,094,268	9,605,689	2,362,632	178,961	180,218	588,851	1,486,141	1,281,993	63,152,726	100.00	Total

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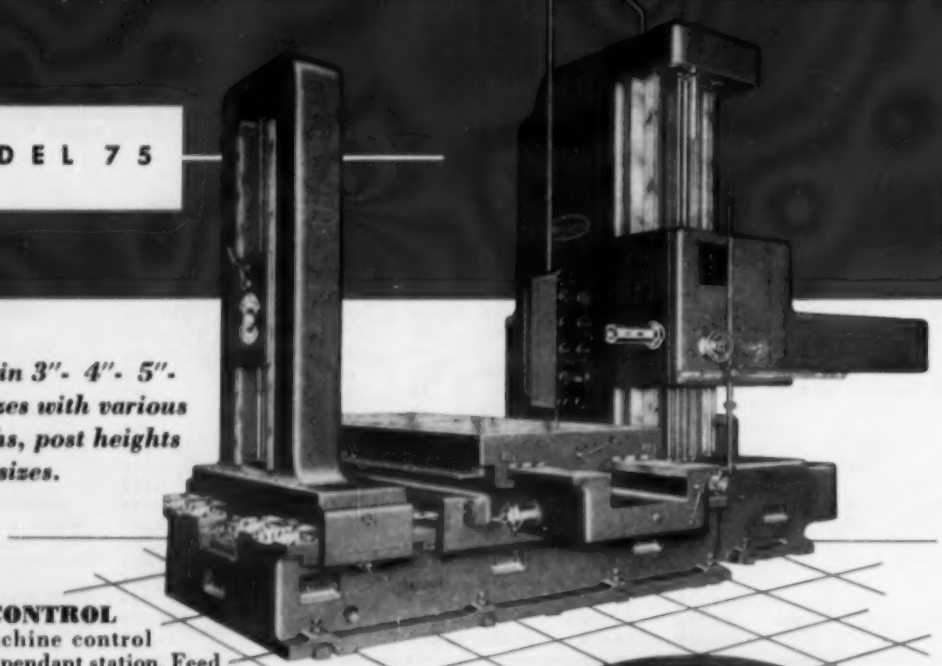

Available in 3"- 4"- 5"- spindle sizes with various bed lengths, post heights and table sizes.

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How Auto Styling Gets That Way

The stylists' dilemma: How to wrap a package to make it distinctive from last year's when its size, shape, weight and price already have been set

STREAMLINED or not, cars of today boast sheet metal draws more complicated than those of their predecessors. As you might suspect, improvements in press plant technique, die design and metallurgy all have played their part in the advance. But you might not suspect that the dream boys of the industry, the stylists, are aware that their dreams must make production sense.

How It Starts—A new car, of course, begins with a concept of the package. This is what management thinks will sell—based on consumer surveys, what competitive management thinks will sell and what underlings think the president thinks will sell. The package specifies size, weight, performance and price of the new car. Engineering then works out a chassis study, meeting the requirements laid down by management. From this is made a package drawing, which includes the seating position, head-room requirements, dash position, over-all front and rear sheet metal overhang, legroom, shoulder room, ground clearance, etc.

You might wonder if this doesn't confine the creation of the stylist to door handles, chrome trim and hub caps. That situation is not entirely removed from truth. The stylist is handed the dimensions of the body, the weight of the body, the cost of the body and is told to come up with something new but not too new. Starting with a package, how many ways can you wrap it?

Thus the stylist, like a dress designer fitting a new garment to much the same old chassis, sets out to create. Starting with the first modeling in clay, tool consultants are on hand to offer advice as ideas take shape. Protrusions that exceed the formability limits of the steel skin are quickly noted. If the stylist thinks it is still worth the effort, estimates of the cost of piecing the shape and metal finishing are computed.

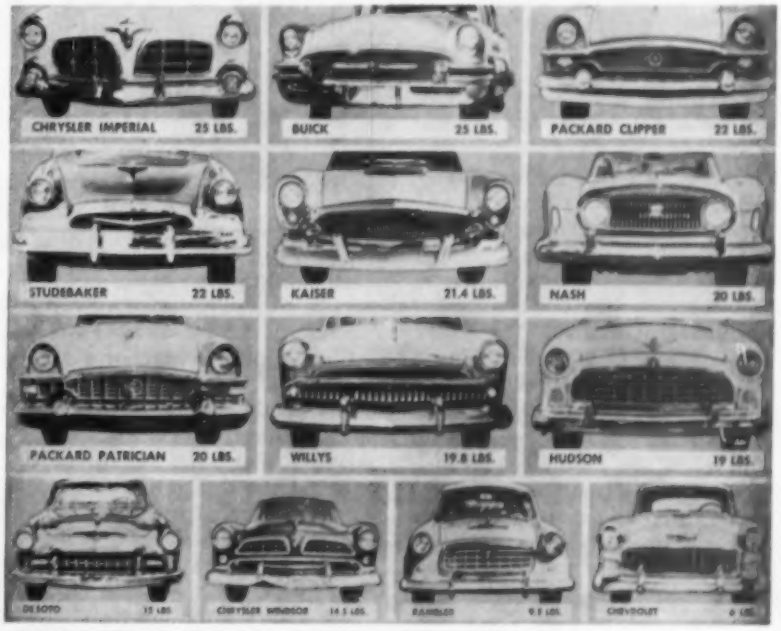
Questions—Where will the panels be joined? Will the joint be one that can be covered with a piece of metal molding or must it be metal finished? How can the joint be made shortest to keep the cost of metal finishing as low as possible? Will there be problems in handling the blank or finished stamping in and out of the die?

Those are but a few of the questions that arise as the tool consultants reduce the stylist's sculpture to something like a dressmaker's patterns in 3-D. And it should be pointed out that the stylists increasingly have a pretty good idea of what is producible and what is not. Every studio has its dreamers for stimulating ideas, but the men whose ideas ultimately see production play it pretty close to the chart.

Case in Point—Needless to say, there is a borderline where an idea may be workable but expensive. Border skirmishes occur regularly as the stylist strives for his effect and the toolman strives for his cost target. Take a matter like the modest headlight.

Forming a fender with headlight hangover not only approaches formability limits on steel but calls for costly restrikes in progressive dies. Adding a bolt-on visor is less costly but may be considered less satisfying aesthetically. Style and production argue whether the headlight must be completely demure or can get by with a peek-a-boo look, maybe even a beanie visor. If the stylist holds out for complete modesty, and wins management to his point of view, the production man figures out the cheapest way to do it, tries to shave costs proportionately elsewhere.

New Approach—Often styling's



Automakers Use More Zinc Diecastings

A survey by the American Zinc Institute reveals that 62 per cent of the 1955 cars are using zinc die-cast grilles. This is one of the few major changes in material specifications since immediately after World War II

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persistence will result in new techniques, however. Tail fins begin to create a problem for welding guns as their length increases further from the deck opening access. Stylists working for the leviathan look forced the innovation of a seam that is turned out rather than in. Covered by the appropriately designed tail light bezel, the seam can be welded from the outside with a normal welding gun.

But that's only part of the story of stylists' contact with production. Not only will each make of car have several models, but corporations have more than one make of car. Developing panels that can be used several places offers one of the biggest fields for saving. The body with trim is the most expensive element of the car. While only a few things can be done with engines, many things can be done with body panels.

Weapons—The four basic weapons in this war on tooling costs are: Restrike, trim and flange, weld on and trim and add. Thus, the standard version of the deluxe version has a restrike to give a character line, or perhaps a trim and flange operation to give a cut-out wheel opening. Panels may be lengthened for some models by welding on an additional piece, or cutting a panel and welding in an additional section.

This panel swapping belies any out-and-out statement of body use in any given group of models. The famous A, B and C bodies of General Motors (A for Chevrolets and Pontiacs; B for Oldsmobiles and small Buicks; and C for Super and Roadmaster Buicks and Cadillacs) are interwoven with a pattern of interchangeable panels. Then there are elongations, as in the Oldsmobile 98 and the Pontiac Star Chiefs.

A Look at Competition—Because of the opportunity for saving and the room for ingenuity in such model camouflage, every automaker carefully unbuilds the bodies of his competitors, measuring for panel differences and similarities between the different models and between makes as well. Techniques which will save a few pennies are important, and every company realizes it has no corner on ingenuity.

Then there's the matter of facelifts, which the stylist must consider, along with the original. Restrike and trim and flange treatment not only have been used to make the same panels different for different makes or models, but also can be used in facelifting to give the appearance of a completely new panel. Occasionally, such modification is used to bail out a model which missed success in the first year's version.

More Factors—Thus far, only the exterior of the car has been considered. Getting back to the stylist working on his basic art design, he must account for the fact that the car must be reinforced, possess reasonable structural rigidity and function as a body. All enter into the exterior configuration. A cutout can't be used right at the spot where a brace must be located for structural reasons; a door can't be curved inward at the bottom if the window is to be lowered without protruding through the side.

Automen speak of the part that is finished last or requires the most time as the "control" item. Time was when the roof panel, with its attached windshield posts and rear deck cowl, was "it." Today, the roof panel, though large, is a relatively simple stamping. The control item, believe it or not, is the inside door panel. Of necessity, development cannot be completed until the exterior of the car is pretty well finalized. Then the layout of window regulators, which must be either power or manual, door latches and the supporting metal configuration gives this part safe title to the last ready for the tool and die shops.

Possibilities — Meanwhile, development work is going on full blast on all sides. Prototypes of the cars have been built up and are going through their paces on the test track. Possibilities of combining parts in a single die are considered. In one case, shortening a center post a fraction of an inch made it possible to get it into the same press with another stamping. The amount of production of a given part also enters into the picture. If the quantity will require more than one set of dies, the possibility of making the parts different at no additional cost presents itself.

Each change proposed, of course, has its repercussions on parts already given tentative approval. Thus, although work progresses on all fronts, a point ultimately is reached beyond which further changes cannot be made and the final specifications must be set. Tooling then is finalized, and suppliers plagued with changes in specifications are now plagued with hurry-up orders.

Such helpers as plastic in models, skins and tooling promise to aid in the accuracy and speed of some operations. But automen don't see any notable shortening of the preproduction time for new models. The planning to cut costs and up quality precludes it.

Auto, Truck Output

U. S. and Canada

	1955	1954
January	780,780†	594,467
February	770,591†	573,801
March	.....	672,485
April	.....	676,248
May	.....	621,262
June	.....	623,732
July	.....	543,540
August	.....	523,799
September	.....	364,441
October	.....	312,078
November	.....	616,395
December	.....	761,954
Total	.....	6,884,202

Week Ended	1955	1954
Feb. 12	191,136	141,570
Feb. 19	198,066	148,257
Feb. 26	195,079	145,980
Mar. 5	192,892	139,263
Mar. 12	203,149	143,478
Mar. 19	201,400*	154,895

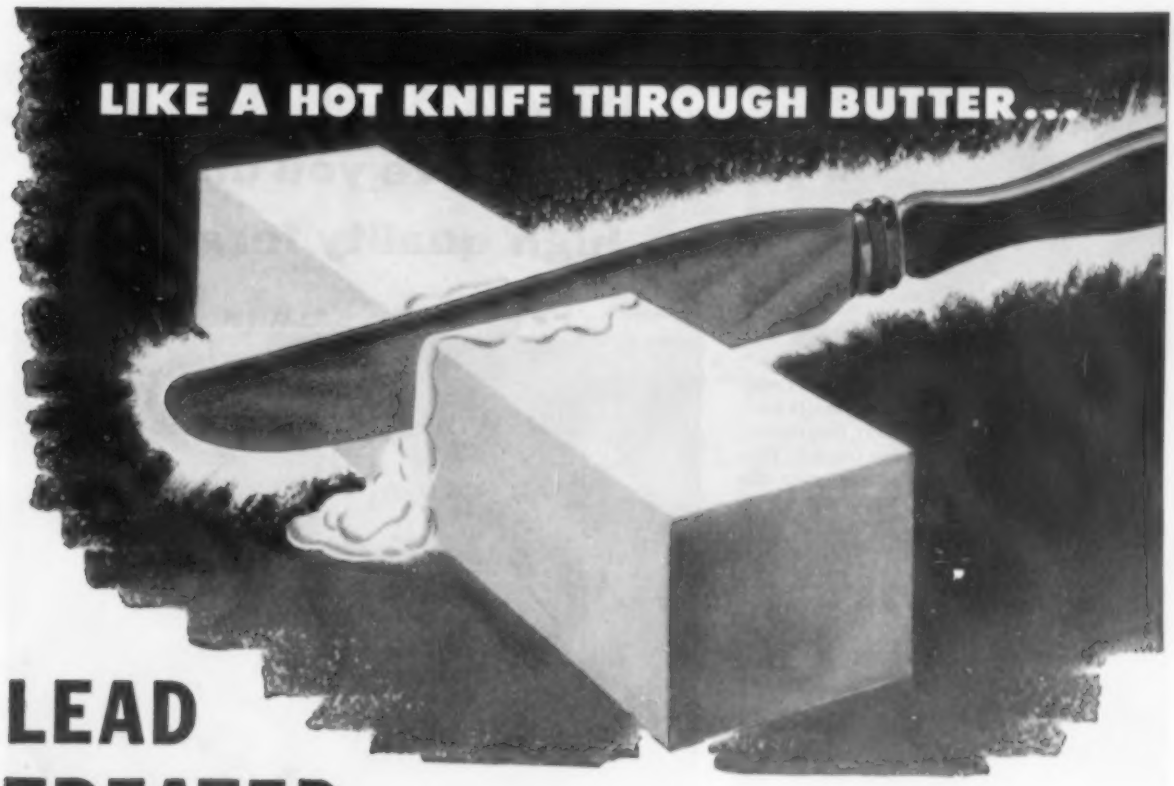
Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

GAW Strike Predicted

"There'll be a strike, most likely at Ford."

So predicts Richard A. Lester, chairman of the department of economics and social institutions at Princeton University.

Speaking before the annual meeting of the Associated Industries of Cleveland, Professor Lester said he opposed the GAW. He said that "inadequate unemployment benefits, especially the ceilings," have caused the demand.



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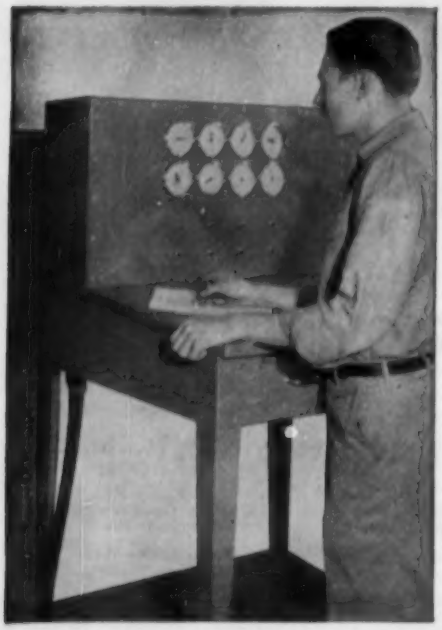

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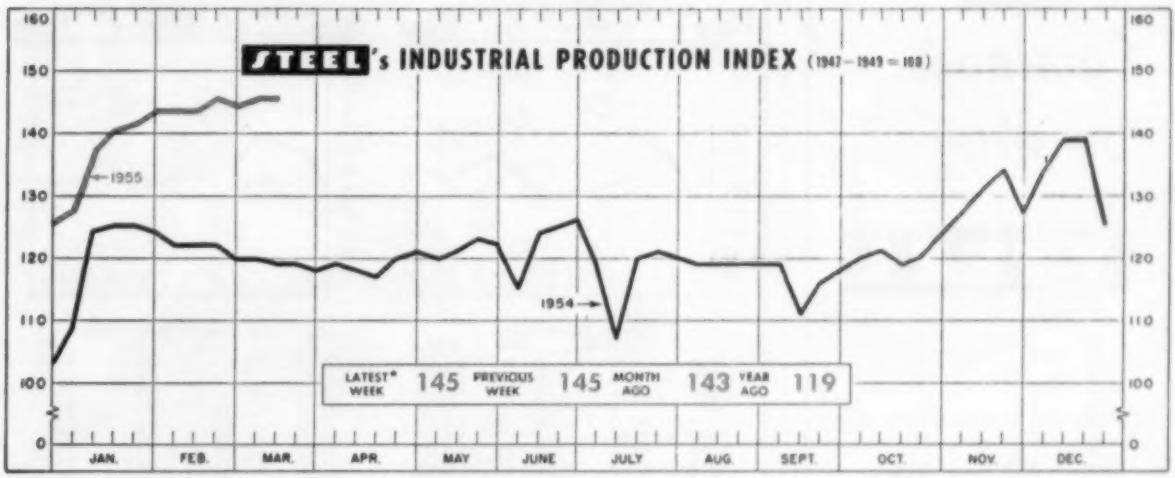
YEARS AHEAD — THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Mar. 12. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%.

Building Outlook: No Letup in Boom This Year

WILL CONSTRUCTION boom or bust in 1955? It's a question that's getting lots of attention. It's important to metalworking because of its effect on equipment, material and appliance demand.

Favorite target for "bust" talk currently is the housing boom, at least it's getting the most publicity, mostly on the dark side.

No Runaway—Much of the talk centers on the fact that houses are being built faster than families are being formed. That is true, but there are other factors putting strength in housing.

Here are some reasons against a runaway slide in housing: Household formations are past the low point; from now on the trend should be up. Families are getting bigger; families want larger, newer houses. Americans are still moving, generally toward warmer sections of the country. Movement from the farms to the cities is still on. Conversely, city folk are moving the other way—into the suburbs, creating a demand not only for houses but for theaters, stores, schools. Better roads are a must.

Brakes—Fears that the unabated housing boom is too good to be true can be gently laid to rest, says the U.S. Chamber of Commerce.

Housing construction will steer a moderate course between overexpansion and any sharp drop off, says M. K. Watson, chairman of the chamber's Construction & Civic Development Committee. Acting as brakes on runaway building, he says, would be probable moderate rises in mortgage interest rates and costs and the slow pace at which water and sewage service can be supplied in suburban areas.

Records — The opposing fear that the present rate of expansion will create a scarcity of mortgage funds is also unfounded, he says. The investment market should have about $1.75 billion more new funds from savings and loan associations, life insurance compa-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,232	2,241	1,613
Electric Power Distributed (million kwhr)	9,700[1]	9,727	8,519
Bitum. Coal Output (1000 tons)	7,735	8,935	6,420
Petroleum Production (daily av.—1000 bbl.)	6,795[1]	6,806	6,458
Construction Volume (ENR—millions)	$358.2	$373.2	$226.5
Automobile, Truck Output (Ward's—units)	203,149	192,892	143,478
TRADE			
Freight Car Loadings (unit—1000 cars)	650[1]	659	610
Business Failures (Dun & Bradstreet, no.)	210[1]	222	229
Currency in Circulation (millions)[3]	$29,816	$29,776	$29,870
Dept. Store Sales (changes from year ago)[3]	+15%	+3%	−11%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,715	$20,634	$16,973
Federal Gross Debt (billions)	$278.1	$278.2	$274.7
Bond Volume, NYSE (millions)	$19.0	$22.8	$18.2
Stocks Sales, NYSE (thousands of shares)	16,211	14,949	9,197
Loans and Investments (billions)[4]	$84.4	$84.3	$79.5
U. S. Gov't. Obligations Held (billions)[4]	$34.6	$34.8	$32.3
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.74
STEEL's Nonferrous Metal Price Index[6]	227.3	227.2	206.7
All Commodities[7]	110.0	110.1	110.6
Commodities Other Than Farm & Foods[7]	115.3	115.3	114.4

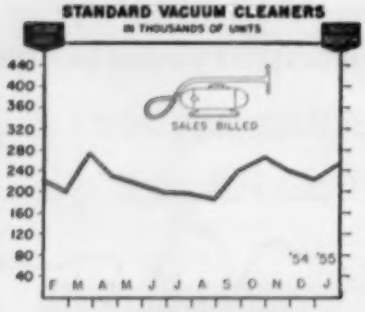
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

Coming
May 2
IN
STEEL

What's Happening to Job Shops?

Circumstances are developing to take some of the wind out of that bellows of industry, the job shop. The stampers, the platers, the foundrymen and many others who do contract manufacturing to make parts for other industries, must meet the increasing threat of competition from their own customers. The auto industry, particularly, is building its own plating lines, foundries, stamping facilities, and that means less business for the job shops who used to supply them. STEEL's May 2 article will give case studies to show what contract manufacturers are doing to offset those losses.

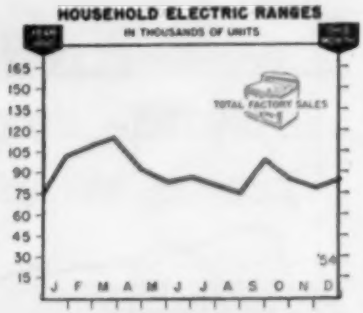
STANDARD VACUUM CLEANERS
IN THOUSANDS OF UNITS



Sales Billed—Units	1955	1954	1953
Jan.	250,123	221,233	255,886
Feb.	.....	199,035	246,007
Mar.	.....	276,464	329,294
Apr.	.....	220,849	268,548
May	.....	209,434	252,404
June	.....	195,781	197,506
July	.....	193,607	159,446
Aug.	.....	185,397	188,536
Sept.	.....	238,235	227,253
Oct.	.....	263,197	249,383
Nov.	.....	237,882	216,227
Dec.	.....	217,022	190,773
Total	.....	2,658,126	2,781,263

Vacuum Cleaner Mfrs. Assn.
Charts Copyright 1955 STEEL.

HOUSEHOLD ELECTRIC RANGES
IN THOUSANDS OF UNITS



Total Factory Sales—Units	1954	1953	1952
Jan.	101,870	88,145	79,982
Feb.	109,647	114,465	63,063
Mar.	115,393	130,788	93,225
Apr.	92,751	118,999	69,149
May	82,649	114,404	66,117
June	85,854	113,086	86,817
July	80,017	77,836	83,465
Aug.	75,907	74,326	74,853
Sept.	99,611	84,481	62,404
Oct.	84,321	73,422	63,143
Nov.	79,340	85,748	72,982
Dec.	85,033	73,870	84,630
Total	1,092,393	1,119,570	901,860

National Electrical Mfrs. Assn.

nies and mutual savings banks alone in 1955.

Another exponent of continuing high levels of home building is L. M. Cassidy, chairman, Johns-Manville Corp. All signs indicate that 1955 will be one of the biggest construction years in the nation's history, he says. During the first two months of 1955 new home starts were at record levels.

About 1.4 Million Homes . . .

"At that rate, if the other ten months of 1955 follow the normal seasonal pattern, about 1.4 million new homes will be built in 1955, equaling or exceeding the record year of 1950," says Mr. Cassidy.

Looking at all phases of construction, he says: "It appears that the fast pace of construction will continue for some years beyond 1955."

In the same vein, Thomas S. Holden, vice chairman of F. W. Dodge Corp., says: "So far the picture looks strikingly similar to last year when (January, February) records were broken as a harbinger of what proved to be the biggest year of construction ever known."

Dodge puts totals at $1.6 billion for February and $3.1 billion for the two-month period, up about 30 per cent from a year ago.

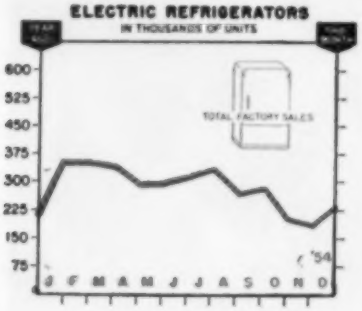
Gains Are Widespread . . .

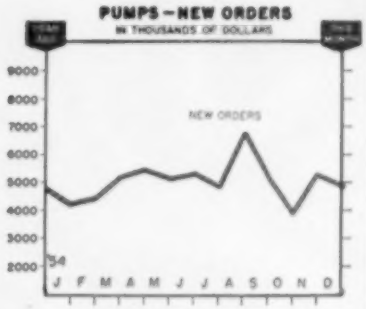
February was the tenth successive month of new monthly highs in Dodge figures which go back 64 years. It would have been the 14th month had not last April been overshadowed by enormous atomic energy contract awards in April of a prior year.

According to Dodge figures, residential building so far this year is up 46 per cent from a year ago. Heavy engineering is 25 per cent higher, indicating that the high construction activity is widespread, an additional deterrent to a sudden collapse.

Costs Stable But High . . .

And likening the current construction activity to the boom-bust of the 1920s is out of date, says the National Industrial Conference Board. Despite record construction outlays, today's physical volume of building is moderate compared to the boom level of the twenties, says the board. A sharp rise in construction costs and the growth of our total economy explain much of the present, high-dollar level of construction.





Total Factory Sales—Units

	1954	1953	1952
Jan.	344,401	325,186	260,259
Feb.	334,122	377,605	259,838
Mar.	330,641	368,498	276,972
Apr.	280,900	366,951	225,994
May	282,164	317,667	217,017
June	303,127	343,114	324,885
July	325,061	298,838	333,877
Aug.	256,665	232,981	250,224
Sept.	271,859	231,224	230,111
Oct.	190,753	179,749	207,065
Nov.	175,557	139,563	256,530
Dec.	228,612	197,102	248,506
Total	3,323,562	3,378,478	3,091,434

National Electrical Mfrs. Assn.

	1954	1953	1952
Jan.	4,067	5,752	5,517
Feb.	4,272	6,521	6,020
Mar.	5,093	8,255	5,925
Apr.	5,319	7,758	6,354
May	5,097	4,629	6,140
June	5,176	5,690	7,957
July	4,733	5,533	6,299
Aug.	6,706	4,886	5,921
Sept.	5,050	4,845	5,258
Oct.	3,828	5,097	5,534
Nov.	5,224	4,634	4,130
Dec.	4,787	4,645	6,575
Total	59,252	68,245	71,630

Hydraulic Institute.

Building costs are at the highest point in history, according to *Engineering News-Record* cost indexes. Prices are currently holding steady, but about 5 per cent above a year ago.

Geographically, building is running ahead of last year in all sections of the country except the South. New all-time records are being set in the Middle-Atlantic area, with awards up 74 per cent from 1954 and well ahead of the previous high in 1953.

Biggest gains above last year are registered in the Far West, up 105 per cent, and west of the Mississippi, up 96 per cent. But records set in earlier years continue to stand.

Workweek, Pay Get Bigger . . .

Metalworking took the lead in rising factory employment in February. That rise offset seasonal drops that usually come between January and February, says the Labor department.

The factory workweek rose along with employment, giving production workers their biggest gross weekly paychecks ever, $74.93. The average workweek was 40.5 hours; 16 of 21 major industry groups took part in the rise, in many cases against the normal trend for this time of year.

Noteworthy is the machinery industry, which showed a gain in employment, aside from minor seasonal changes, for the first time in two years. Employment in iron and steel racked up its fifth successive month of gains.

Continued expansion of production in auto plants, plus small gains in shipbuilding and railroad equipment building, made for a rise in transportation employment.

Trends Fore and Aft . . .

New orders for Fruehauf commercial freight hauling trailers are currently at record levels, says Roy Fruehauf, president of Fruehauf Trailer Corp. "The outlook for 1955 is good," he told stockholders . . . Federal-Mogul Corp., Detroit, reports increasing sales of ball bearings to farm implement manufacturers . . . Estimated net income of 130 Class I railroads in January was $52 million compared with $20 million a year ago, says Association of American Railroads . . . Wholesale sales in January were $8.7 billion, up $700 million from last year. Seasonally adjusted, sales of durable goods were up 3 per cent, offsetting a slip in nondurables.

He sharpened his pencil

and cut fuel costs 47%

Irked at furnace fuel costs, this industrial executive put the finger—and the pencil—on the BTU Burglar's persistent thefts—billions of BTU's worth thousands of dollars per year.

This is a typical example. A steel casting plant had two similar annealing furnaces side by side, with similar operating conditions. They lined one with insulating firebrick—and saved $3,864 in fuel costs.

Why do *lightweight* firebrick save you money on fuel? Their lightness is due to millions of tiny, insulating air cells. These cells keep the heat *inside* the furnace where it works for you, instead of letting it escape.

The lighter the brick, the better it insulates and the more you save on fuel. The lightest of all are B&W Insulating Firebrick, success-proved in thousands of furnaces for durability as well as high dollar savings.

Wouldn't it be well worth your time to discuss insulating firebrick with those responsible for your furnace operations? For details, call in the local B&W Refractories Engineer or write directly to B&W.

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WORKS: AUGUSTA, GA.

R-907

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The secret lies in the arched base and prongs of the SPEED NUT. As the screw is tightened, the flexible SPEED NUT flattens, setting in action two distinct forces that lock for keeps. Yet a firm twist of the screwdriver is all that is needed to relieve those forces and loosen the fastener.

Savings in unit cost, in man-hours of application, in parts handling, are the important reasons why SPEED NUT brand fasteners are in service on your automobile, television set, home appliances and other assembled products. Write for "SPEED NUT Savings Stories", actual case histories of short cuts to assembly and production savings.

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Canada: Dominion Fasteners, Ltd., Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

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TYPICAL USES

Total cost of control-equipment enclosure reduced by 30% with "J" type SPEED NUTS!

Specially developed SPEED NUTS cut assembly costs of adjustable awning by 63%!

SPEED NUTS lower assembly costs 40% on casement-window air conditioner!

ROBERT G. HESS
. . . gen. mgr. of Washburn Co.

Robert G. Hess was named general manager, **Washburn Co.** (Worcester, Mass., and Rockford, Ill.) and its subsidiaries. **Albert L. Zuck** was made manager of the Worcester division to succeed Mr. Hess. Associated with Washburn since 1923, Mr. Hess succeeds **John S. Tomajan**, who continues as president of Washburn and Michigan Wire Goods Co., and chairman of the board of Andrews Wire Works of Canada Ltd., Watford, Ont.

Frederick Farnow was appointed Pacific Coast manager, **Federated Metals Division**, American Smelting & Refining Co., replacing **Leo Halpern**, who is resigning May 1. Mr. Farnow is manager of the San Francisco plant.

Roy L. Salter was made first vice president of the **Southern Wheel Division** of American Brake Shoe Co. He continues headquarters in New York.

Rae Hasselbring was made manager of industrial metals for **Southern States Iron Roofing Co.**, Savannah, Ga.

Stephen D. Moxley was elected president, **American Cast Iron Pipe Co.**, Birmingham, to succeed **Charles O. Hodges**, retired. **Arnold J. Herrmann** was elected vice president-sales manager; **Frank H. Coupland**, vice president - works manager; and **Kenneth R. Daniel**, vice president-chief engineer.

JAMES E. IRVING
. . . Irving Subway Grating executive

James E. Irving was elected president of the western division of **Irving Subway Grating Co. Inc.**, Oakland, Calif., to succeed the late **J. C. Lynn**. Mr. Irving will continue as executive vice president of the parent company which has offices in Long Island City, N. Y. **Charles M. Thomson**, formerly vice president and division manager, was appointed executive vice president of the Pacific Coast plant. **Robert H. Salisbury** was made manager of sales.

Harold Ashton was made manager-sales and service for **National Broach & Machine Co.**, Detroit. He was chief service engineer.

Wallace N. Barker, former executive vice president, Pullman-Standard Car Mfg. Co., was elected executive vice president of **Fruehauf Trailer Co.**, Detroit. He joined Fruehauf in 1954.

H. E. McPherson was made assistant district sales manager at New York for **Republic Steel Corp.** He is succeeded as Pittsburgh district sales manager by **Nelson E. Walker**, presently assistant manager of the Cleveland district sales office. Changes are effective Apr. 1.

John J. Farrell succeeds the late **Ralph G. Farrell** as chairman of **Fairmont Aluminum Co.**, Fairmont, W. Va. **Robert T. Farrell** was elected a vice president.

JOSEPH D. DELANEY
. . . Cincinnati p. a. for Trailmobile

Joseph D. Delaney was named Cincinnati plant purchasing agent for **Trailmobile Inc.** He was a plant buyer. Before joining Trailmobile in 1953, Mr. Delaney was assistant purchasing agent for Kirk & Blum Mfg. Co.

At the **Shakeproof Division** of Illinois Tool Works, **A. L. Pontius** was made general manager of the stamped products division at Des Plaines, Ill.; **William E. Bruse**, general manager of the threaded products division at Elgin, Ill.; and **Kenneth C. Mackay**, assistant general manager, threaded products division.

Warwick J. Hayes Jr. was named vice president-sales and **E. W. Taylor Jr.** vice president-engineering at **Industrial Brownhoist Corp.**, Bay City, Mich. Mr. Hayes was sales manager. Mr. Taylor was chief engineer.

Cleveland Instrument Co., Cleveland, appointed **C. Thorpe Thompson** executive vice president and general sales manager. He was with Brush Electronics Co.

Harry V. May was made plant manager of **Bridgeport Brass Co.'s** aluminum division in Adrian, Mich.

Guy M. Karm was promoted to purchasing agent of **Aetna Ball & Roller Bearing Co.**, Chicago, a di-

GRAHAM BARTON
. . . Walsh Metal Products eng. supervisor

WEBSTER E. BARTH
. . . Eastern Brass & Copper sales mgr.

O. MULLER-HABIG
. . . new president of Centrico Inc.

vision of Parkersburg-Aetna Corp. He succeeds **B. E. Vergowe**, retired.

Graham Barton was appointed supervisor of engineering of **Walsh Metal Products**, a division of Michigan Oven Co., Detroit.

A. W. Orr and **J. W. Roper** were appointed buyers of metal scrap for **National Lead Co.** Mr. Orr is at the St. Louis plant, Mr. Roper at the Dallas plant.

William H. Beretish was named vice president in charge of manufacturing and subcontracting for **Automatic Records Corp.**, Los Angeles.

Robert T. Keller was named chief of West Coast plant operations for **Chrysler Corp.**, with offices in Los Angeles.

Dykstra Engineering Co., Los Angeles, appointed **Donald Storm** sales manager and **Richard P. Edwards** chief engineer.

J. E. Kunkler was made sales manager of the southwestern division of **Armco Drainage & Metal Products Inc.** at Houston, effective Apr. 1. He is succeeded in Los Angeles by **J. B. Evans** as manager of sales for the Calco Division in southern California and Arizona.

H. E. Brunder was elected vice president and **C. E. Stender** secretary of **Pressed Steel Tank Co.**, Chicago.

Webster E. Barth was made sales manager of **Eastern Brass & Copper Co.**, New York. He was with LaPointe Electronics Inc. as general sales manager. Before that, he was northeastern regional sales manager for the industrial parts division of Reynolds Metals Co.

Charles E. Meyer was elected vice president and **Robert P. Sullivan** plant superintendent of **Barrows Porcelain Enamel Co.**, Cincinnati.

Cross Co., Detroit, named **A. J. McLaren** vice president-sales and **Kurt O. Tech** vice president-engineering. Mr. McLaren was sales manager since 1953. Mr. Tech was chief engineer for nine years.

Centrico Inc., Englewood, N. J., elected **O. Muller-Habig** president to succeed the late **Heinz W. Habig**. Centrico is sole distributor and representative in the United States of Westfalia Separator A. G. of Oelde, West Germany.

William Tucker was elected vice president and director of manufacturing for **F. C. Russell Co.**, Cleveland.

Westinghouse Electric Corp., Pittsburgh, made **Thurman L. Rundlett** assistant planning director of new products. **D. W. McGill** is the new manager of the steel mill and metalworking section in its industrial

A. J. McLAREN

KURT O. TECH

. . . Cross Co. v. p.-sales, v. p.-engineering

IF YOU COULD CREATE A CITY IN THE U.S. FOR YOUR PLANT

You'd Choose OSWEGO, N.Y.

GREAT LAKES "GATEWAY TO THE ATLANTIC" VIA ST. LAWRENCE AND N. Y. BARGE CANAL

The building of the mighty St. Lawrence Seaway has already started the creation of new industrial, transportation and economic centers.

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It is the closest lake port city to the Atlantic Ocean—now by N. Y. Barge Canal, railroads and highways, and — tomorrow — by the Seaway. There is no bottleneck such as the Welland Canal between Lake Erie and Lake Ontario to slow down commerce.

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- Iron ore, aluminum, nickel, timber and other raw and semi-processed materials from Canada will reach the United States most quickly and easily through Oswego, N. Y.
- Raw materials from all over the world which depend on low cost bulk transportation will reach the United States most easily and economically through Oswego, N. Y.
- Manufactured products from the industrial northeast will flow directly and economically to Canada and world ports through Oswego, N. Y.
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RUSSELL B. BARNETT
. . . Peter A. Frasse & Co. president

BRENT R. ANDERSON
. . . Anderson Corp. president

ARTHUR T. DALTON
. . . Chicago Wheel & Mfg. v. p.-sales

department, East Pittsburgh plant.

Peter A. Frasse & Co. Inc., New York, elected **Russell B. Barnett** president and **Theodore W. Hager** vice chairman of the board. Mr. Barnett, associated with Frasse since 1914, has been vice president-sales since 1943. Other executive appointments include: **John M. Brion**, vice president and secretary; **Lester E. Brion Jr.**, vice president; **Frank M. Daughety**, treasurer; **John D. Drummond**, vice president at Philadelphia; and **Bernard Dolan**, assistant vice president in charge of sales.

Edward E. McGinley was made assistant general superintendent of U. S. Steel Corp.'s **Edgar Thomson Works**, Bessemer, Pa.

Francis A. Gibbons was elected senior vice president, **General Aniline & Film Corp.**, New York. He continues as vice president-finance and will assist the president in company operations. **Dr. Leopold Eckler** was elected vice president of the corporation and general manager of its Ansco Division.

Brent R. Anderson, former vice president, was elected president of **Anderson Corp.**, Worcester, Mass. **William C. Arthur**, formerly with Norton Co., was elected vice president and assistant works manager. **S. Malcolm Blanch**, clerk-treasurer, was also elected chairman of the board.

Clifford H. Keen was made assistant general sales manager of **Hubbard & Co.**, Pittsburgh.

K. C. Deacon was promoted to vice president, Dodge Division, and general manager-trucks for **Chrysler Corp.**, Detroit.

Wheeling Steel Corp. made **J. J. Caveney** assistant to the general manager of its Yorkville, O., Works, and **T. J. Cox** assistant general manager of its Ackermann factory in Wheeling.

Robert Jensen was made Baltimore branch manager for **Kaiser Aluminum & Chemical Sales Inc.** He replaces **Donald C. Heyel**, now manager of the St. Louis sales district.

Arthur T. Dalton was elected vice president-sales, **Chicago Wheel & Mfg. Co.**, Chicago. He was secretary and sales manager. **Henry M. Mann**, formerly treasurer and chief of sales engineering, was elected secretary-treasurer.

Harry K. Withrow was appointed buyer in charge of outside production for **ElectroData Corp.**, Pasadena, Calif.

Flexonics Corp., Maywood, Ill., elected **George C. Toepper** vice president in charge of manufacturing and **Thomas K. Wells** vice president in charge of sales.

Clarence C. Walker was named to succeed **Ray W. Turnbull** as commercial vice president at San Francisco for **General Electric Co.** Mr. Turnbull will act in a consulting capacity until retirement June 30. **C. Howard Black** succeeds Mr. Walker as general manager, construction materials division, Bridgeport, Conn. **Edwin E. Parker** was made general manager, instrument division, Lynn, Mass., replacing Mr. Black, effective Apr. 1.

OBITUARIES...

John G. Milson, 48, purchasing agent for **Buffalo Arms Inc.**, Buffalo, died Mar. 6.

J. Robert Wiss, 63, president and a director of **J. Wiss & Sons**, Newark, N. J., died Mar. 8.

Frank J. DeBisschop, 76, president of **United Wire & Supply Corp.**, Cranston, R. I., died Mar. 7.

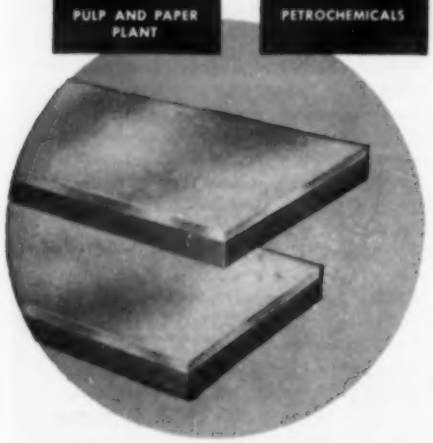
Thomas E. Costner Sr., 55, general manager of mines and land for **U. S. Pipe & Foundry Co.**, Birmingham, died Mar. 1.

Roy D. Hall, 75, retired research engineer and former manager of **Westinghouse Electric Corp.'s** tungsten products division in Bloomfield, N. J., died Mar. 4.

Benedict H. Mathis, 60, former vice president and general manager, **Warren Tank Car Co.**, Warren, Pa., died Feb. 28.

Boyd H. Carr Sr., 67, former head of pricing, **Dow Chemical Co.**, Midland, Mich., died Mar. 1.

how to get Stainless Steel advantages ...*at lower cost*



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Now you can get what has been long needed . . . a sintered carbide produced specifically for steel milling cutter purposes, exhaustively tested and *proved* to be superior to any grade previously available.

The *new* FIRTHITE TXL definitely increases the volume of metal removed in mass production operations, materially reduces unit costs—through uniform performance from remarkable strength with higher wear and crater resistance.

FIRTHITE TXL is not just a new grade designation for a "hopped up" existing grade. It is a completely new combination of materials and processes painstakingly worked out in Firth Sterling research laboratories and pilot plants to do *one job better than it has ever been done before.*

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Firthite TXL, through exhaustive tests in both Firth Sterling laboratories and in the field, has given superior performance. In a recent test by a prominent Midwestern milling cutter manufacturer, Firthite TXL, against ten competitive grades, proved superior in all cases and showed from 25% to 55% less wear at 5 cuts and 23% less wear at 20 cuts. Six grades were worn beyond repair before the test was completed.

The test was conducted under severe breakdown conditions on a 10" milling machine using a 6" R.H. cutter with one tooth . . . 1" square with 1/32 corner radius. The material used was SAE 1020 normalized forged bar steel which was climb milled at 1375 S.F.P.M. with 4⅛ inches per minute feed resulting in approximately .0053" chip load. Depth of cut was .050" and overhang of work was 3".

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Foundries Change Hands

Consolidated Foundries & Mfg. Corp. buys plants in Michigan, Wisconsin, Illinois, Iowa

FOUR COMPANIES have been acquired by Consolidated Foundries & Mfg. Corp. This marks another step in the firm's long-range plan of expansion, diversification and investment in going businesses. Latest purchases include:

Consolidated Foundries Inc., Chicago—This firm operates four divisions: Crucible Steel Casting Co., Milwaukee (carbon and low-alloy steel castings); Michigan Steel Casting Co., Detroit (high-alloy heat-and-corrosion resistant steel castings); Western Foundry Co., Holland, Mich. (gray iron castings); and Ebaloy Foundries Co., Rockford, Ill. (sand and permanent mold aluminum castings).

Iowa-Michigan Corp., Chicago—This firm operates two divisions: Misco Precision Casting Co., with plants in Detroit and Whitehall, Mich. (superalloy investment castings, principally for gas-turbine aircraft engines); Iowa Soap Co., Burlington, Iowa (general line of soap products).

Available Truck Co., Chicago—This firm makes crane carriers and other custom truck chassis.

United States Brewing Co., Chicago—This firm produces beer.

No changes in management, personnel or policies of any of the companies are contemplated.

Buys Building in Baltimore

Eastern Venetian Blind Co., Baltimore, manufacturer of venetian blind production equipment and metal stampings, acquired a building at Hamburg and Bayard streets. The property contains 139,000 square feet to be used for manufacture and storage.

Bliss To Buy Pittsburgh Firm

E. W. Bliss Co., Canton, O., will acquire Mackintosh-Hemphill Co., Pittsburgh, subject to approval by the latter's stockholders. The foundry and engineering firm would continue to operate as a division of Bliss, a builder of metalworking presses and supplier of rolling mill equipment, can-making machinery and diemakers' supplies. Mackintosh-Hemphill operates iron and steel rollmaking facilities at Pittsburgh and Midland, Pa., and makes slag-handling equipment, rotary straighteners for pipe and tube and large custom-built lathes.

Dayton Malleable Buys Firms

Dayton Malleable Iron Co., Dayton, O., purchased Meta-Mold Aluminum Co. and its subsidiary, Metal-Mold Magnesium Co., Cedarburg, Wis., producers of castings, including appliance and motor parts. Anthony Haswell, president of Dayton Malleable, will become Meta-Mold's board chairman. P. J. Watry will continue as president. O. B. Dickman and M. C. Watry will remain as vice president and secretary, respectively. Three officers of Dayton Malleable will serve in similar positions with Meta-Mold: F. O. Parker, vice president; R. C. Hayward, treasurer; and R. K. Hill, assistant secretary-treasurer.

Allis-Chalmers Buys Baker Mfg.

Allis-Chalmers Mfg. Co., Milwaukee, purchased Baker Mfg. Co., Springfield, Ill., and will begin operating the properties on Apr. 1. Baker manufactures road building equipment and snow plows for trucks and tractors.

Chicago Foundry Diversifies

American Steel Foundries, Chicago, is diversifying its operations through purchase of Pipe Line Service Corp., Franklin Park, Ill. The latter company coats and wraps steel pipe. Pipe Line will be operated as a subsidiary with Alex Duaei continuing as president. The Chicago firm, one of the world's largest steel casting companies, makes freight car trucks, brakes for trains, couplers and running gear components and other railroad equipment, hydraulic machinery (such as forming, molding and extrusion presses), boring mills, and many types of springs and forgings for industrial and commercial uses. Its subsidiary, Griffin Wheel Co., makes chilled iron and steel wheels for railroad freight cars. Diamond Chain Co., another subsidiary, makes precision roller chains and sprockets.

Fabricators To Consolidate

American Metal Products Co., Detroit, and Alliance Ware Inc., Alliance, O., will consolidate, subject to approval by stockholders. American Metal supplies fabricated metal products to the automotive and aircraft industries. Alliance Ware makes porcelain-on-steel bathtubs, lavatories, sinks and related items.

National Gypsum Expands Plant

National Gypsum Co., Buffalo, is building an addition to its plant in Niles, O. It will house facilities for new, metal building products and improved production facilities for existing products. The plant makes metal lath, metal corner beads, cold-rolled channel and acoustical metal.

Tipp Mfg. Co. Changes Hands

Tipp Mfg. Co., Tipp City, O., manufacturer of conveyor systems, has been purchased by a group of Cleveland investors headed by R. E. Britt, the new president. Ted Black will handle manufacturing and engineering operations as vice president and general manager. James J. Murley is secretary.

Kyle Steel Enlarges Plant

Kyle Steel Co. completed construction of a 75,000-sq-ft plant in El Monte, Calif. It will fabricate steel for industrial and commercial buildings.

Warehouse Opened in Chicago

Phelps Dodge Refining Corp., New York, opened a warehouse at 5310 W. 66th St., Chicago, where stocks of copper sulphate and nickel sulphate will be carried. The Chicago sales office of the firm has been moved to the new warehouse.

U. S. Steel Homes Expands

United States Steel Homes Inc., New Albany, Ind., a subsidiary of United States Steel Corp., Pittsburgh, plans immediate expansion to increase production capacity at its New Albany plant. The expan-

(*Pease turn to page* 104)

STANDARD

STANDARD OIL COMPANY
(Indiana)

Tool Room Superintendent Max Chase (left) and Production Engineer Peter Van Dyke (right) with Standard lubrication specialist R. T. Cleland inspect frame of extruded aluminum. Bob Cleland, a graduate of Michigan State with a B.S. in Mechanical Engineering and of Standard's Sales Engineering School, has the background to provide customers with competent technical service on their lubrication problems. This training and experience, customers have found, pay off *for them.*

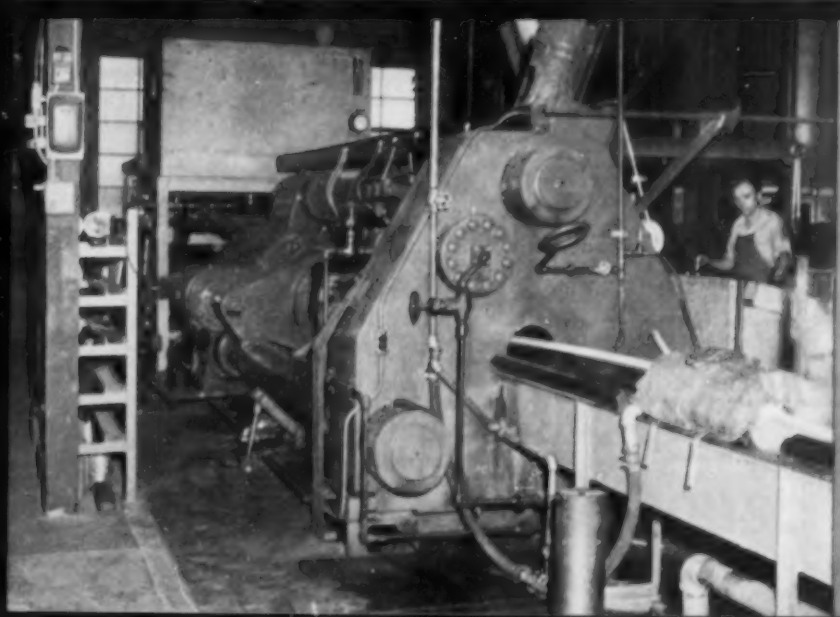
STANOIL *Industrial Oil does heavy chores for Light Metals Corporation*

Three years ago Light Metals Corporation, Grand Rapids, put their 1,250 ton Hydropress into operation. The initial fill for the hydraulic system was STANOIL Industrial Oil. The press has operated continuously since its start up. There is no evidence of deposits or varnish anywhere in the hydraulic system. Light Metals Corporation looks forward to many more years of such trouble-free operation.

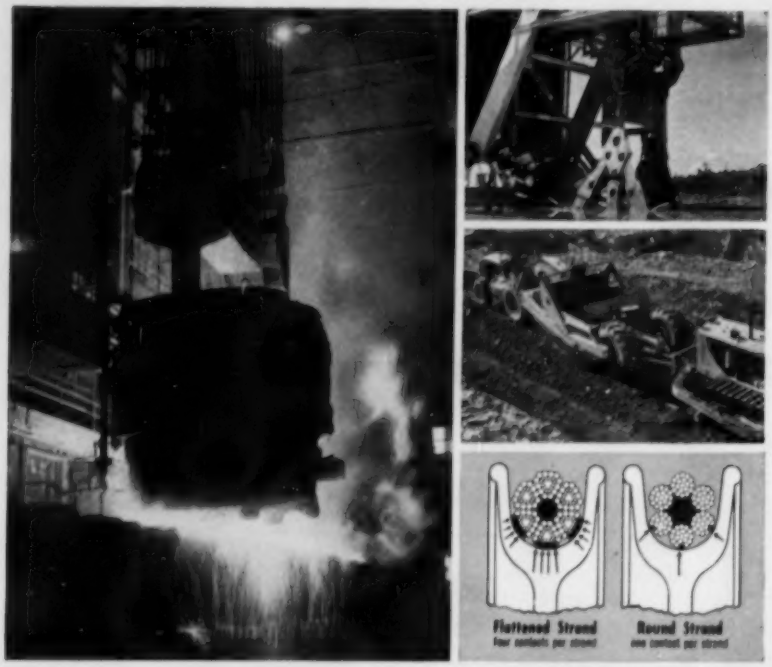
Why was STANOIL ordered by Light Metals for their Hydropress? The answer is found in the service STANOIL has given in other equipment. Back in 1948 when a Watson-Stillman extrusion press went into operation for Light Metals, STANOIL was chosen as the hydraulic oil. As with the Hydropress, STANOIL has a perfect performance record. The Watson-Stillman press has operated seven years without a shutdown because of hydraulic fluid failure.

This kind of service from a hydraulic oil means Light Metals Corporation can turn out extruded aluminum shapes for the aircraft, automotive and major appliance industries with high performance and low maintenance factors that mean bigger profits. Reason enough for relying on STANOIL.

STANOIL Industrial Oil can perform for you just as it is doing for Light Metals Corporation. In the Midwest a lubrication specialist from your nearby Standard Oil office will explain how. Call him. Or contact, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Light Metals Corporation uses this 1,250 ton Hydropress for extrusion of aluminum shapes for aircraft, automotive and major appliance industries. Press operates at 2,840 psi in the hydraulic system. Hydraulic medium is STANOIL.



How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope—and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.

Depend on Leschen's higher-than-rated quality for longer-than-expected service.

LESCHEN
HERCULES *Red-Strand*® WIRE ROPE
LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri
HKP

(Concluded from page 101)

sion program anticipates additional shipping facilities, as well as new machinery and improvements in the current mass-production lines. The project will be completed early this summer so that the virtually doubled production capacity of the company may be used in the 1955 home building sales and shipments.

Staples Tool Changes Hands

National Twist Drill & Tool Co., Rochester, Mich., purchased Staples Tool Co., Cincinnati, manufacturer of carbide-tipped reamers, counterbores and end mills. The new owners plan improvements and additions of equipment and processes at the Cincinnati plant.

Tapco Plans Research Center

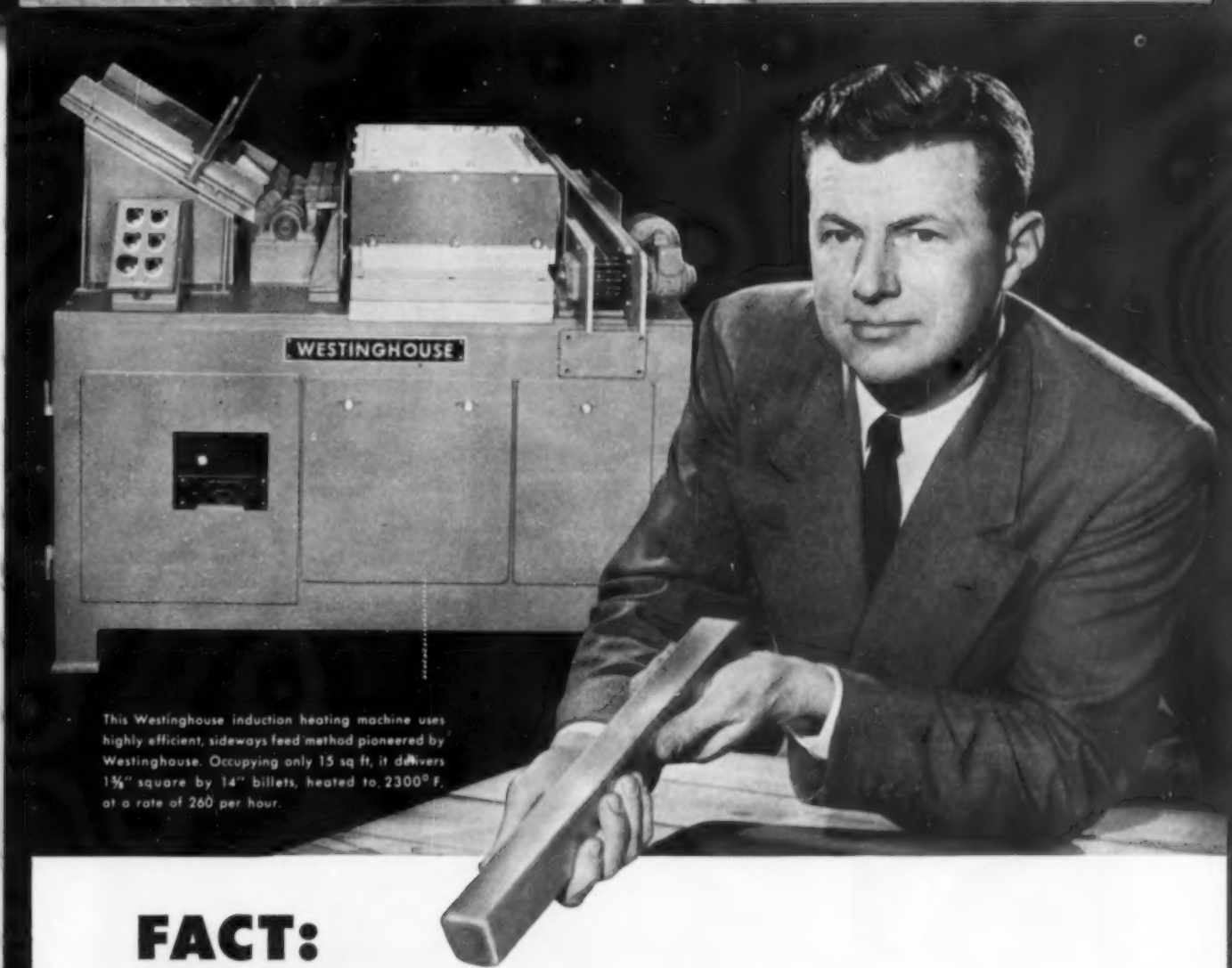
Thompson Products Inc., Cleveland, manufacturer of aircraft, automotive and electronic parts, plans to build a $5-million engineering study center on a site just east of its Tapco plant at 23555 Euclid Ave., Euclid, O. Construction of two units, costing about $2 million, will be started by the fall of this year. The research center is intended to facilitate the development of new products, processes and materials, and will make it possible for the company to consolidate a number of its central staff engineering and research facilities.

Railroad To Build Pipelines

Southern Pacific Railroad will spend $30 million to enter the pipeline business. It has formed a new company, Southern Pacific Pipe Lines Inc., and will construct pipelines from the Los Angeles and El Paso, Tex., refineries to Phoenix and Tucson, Ariz. About 800 miles of 16, 12 and 8-in. pipe will be laid. This is believed to be the first time a railroad has entered the pipeline field.

Super Tool Opens Plant

Super Tool Co., Detroit, opened a plant at Elk Rapids, Mich. The firm makes standard carbide drills, reamers, milling cutters, saws, lathe tools and other metal cutting tools, masonry and glass drills. The



This Westinghouse induction heating machine uses highly efficient, sideways feed method pioneered by Westinghouse. Occupying only 15 sq ft, it delivers 1⅝" square by 14" billets, heated to 2300° F, at a rate of 260 per hour.

FACT:

This completely automatic billet heater cuts forging costs . . . ups production

These specific advantages tell why:

Scale Loss—0.6% is typical—60 to 80% less than other heating methods, *because* the speed and precision of Westinghouse induction heating doesn't give scale a chance to form.

Maintenance Costs—80% reduction is not at all unusual, *because* Westinghouse design gives you high availability—minimizes maintenance labor costs.

Down-Time Production Loss—Extremely low down time of Westinghouse induction heating equipment compared with other heating methods means less lost production.

Labor Costs—50% savings are not at all unusual, *because* Westinghouse automatic equipment eliminates handling operations.

Other Advantages, including significant space savings; cool, clean working conditions; quick start-up and very low stand-by losses, combine to make Westinghouse induction heating your best investment in advanced, lowest cost billet heating.

For sound advice on reducing *your* forging costs, call The Man With The Facts—your Westinghouse sales engineer. And—ask him for your copy of booklet B-6519, or write Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania. J-02295

YOU CAN BE **SURE**...IF IT'S

Westinghouse

speed
YOUR PRODUCTION
AT LOWER COST
WITH—
WYCKOFF
Cold Drawn CARBON & ALLOY
WIDE
FLATS
UP TO 2" x 12"
Wyckoff Precision Wide Flat Sections are cold drawn to close tolerances and will definitely reduce your machining and assembly costs for gauges, gigs and fixtures, machine tool bases, die plates, and other heavy machinery parts.
WYCKOFF
QUALITY CONTROL
Insures
• Accuracy of Section
• Square Corners to Your Needs
• Straight Edges
• Smooth Uniform Surfaces
• Furnace Treatment to Your Specifications
WYCKOFF STEEL CO.
GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.
Branch Offices in Principal Cities
Works: Ambridge, Pa. • Chicago, Ill.
Newark, N.J. • Putnam, Conn.
WYCKOFF STEEL PRODUCTS—Carbon and Alloy Steels • Turned and Polished Shafting
Turned and Ground Shafting • Wide Flats up to 12" x 2" • All types of furnace treated Steels

company recently opened a factory branch and warehouse at Glendale, Calif., and warehouses at New York and Chicago.

Connor Spring Builds in Texas

Connor Spring Mfg. Co., San Francisco, is building a manufacturing plant in Dallas. A self-contained unit, it is scheduled to be in full operation by April.

Pantex Buys Engineering Firm

Pantex Mfg. Corp., Pawtucket, R. I., maker of laundry and dry-cleaning equipment, hydraulic valves and plug valve actuators, acquired Livingston Engineering Co., Worcester, Mass., producer of electrode-type electric boilers, steam jet cleaners and superheaters.

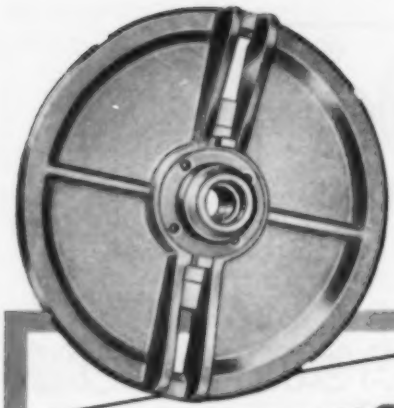
ASSOCIATIONS

Chicago Electro-Platers Institute, Chicago, elected R. L. Giesel, as chairman to succeed C. N. Jensen, Jensen Plating Works. Mr. Giesel is president of Adolph Plating Inc. John Lietz, B. Mercil & Sons Plating Co., is vice chairman; and H. W. Baker, Electro

Counting the Minutes

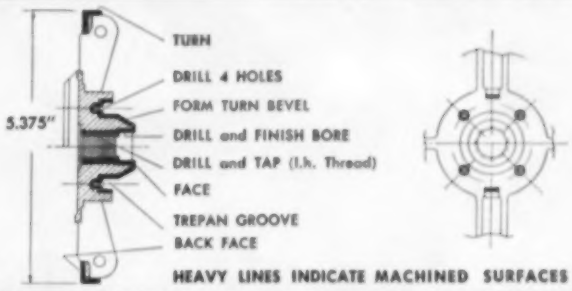
Cab riders can be pretty sure that the taximeter has registered the correct fare. Meters get a rigid inspection before delivery by the producer. A Rockwell Mfg. Co. technician uses a stop watch (above) to check waiting time mechanism before executing next step in assembly process

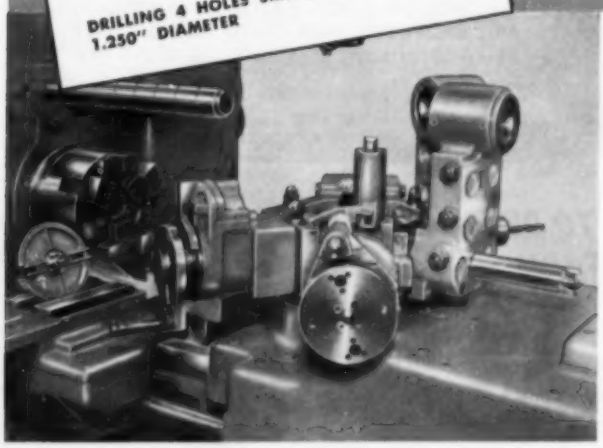
RIGHT WAY
to machine
LEFT HAND Threads!



JOB FACTS:

PART NAME — FLYWHEEL
MATERIAL — BRONZE CASTING
MACHINING — 10 SEPARATE CUTS — INCLUDING
TAPPING A 9/16-12 NC LEFT HAND THREAD
AND
DRILLING 4 HOLES SIMULTANEOUSLY ON A 1.250" DIAMETER





ALL COMPLETED IN A SINGLE OPERATION... IN 1.65 MINUTES ON A 3-U SPEED-FLEX Automatic WITH P&J TOOLING

It takes a really fast-cutting P&J Automatic — like the 3-U Speed-Flex — to turn out 31 of these precision parts every hour. And it takes truly efficient P&J Tooling to handle all of the specified cuts in a single, fully automatic cycle with no secondary operations required. The close-up of the tooling shows the special P&J-designed Head that drills all 4 holes at once in definite relation to the cast grooves in the piece . . . and the P&J Tapping Unit that machines the 9/16 — 12NC left hand thread.

DON'T overlook opportunities like this for reducing costs, increasing profits and improving product quality.

DO send today for your copy of "34 Practical Production Ideas" Booklet . . . and ask P&J Tooling Engineers to submit recommendations based on your own sample parts or prints.

MODERNIZE WITH POTTER & JOHNSTON REPLACE FOR PROFIT

THE MACHINE TOOL SHOW
CHICAGO, ILL.
SEPT. 6-17, 1955

WRITE DIRECT OR CONTACT YOUR NEAREST PRATT & WHITNEY BRANCH OFFICE

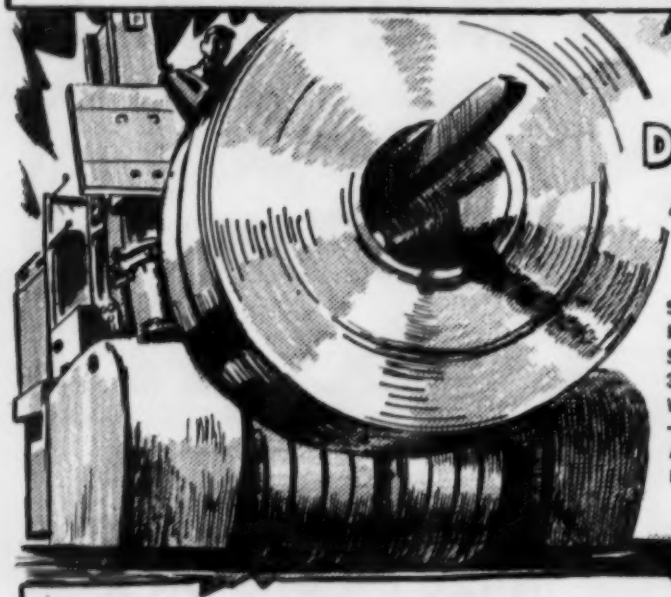
BIRMINGHAM • BOSTON • CHICAGO
CINCINNATI • CLEVELAND • DETROIT
LOS ANGELES • NEW YORK • PHILADELPHIA
PITTSBURGH • ROCHESTER • SAN FRANCISCO • ST. LOUIS
EXPORT DEPT., PAWTUCKET, R. I.
AGENTS: DALLAS, THE STANCO CO.
HOUSTON, WESSENDORFF, NELMS & CO.

POTTER & JOHNSTON CO.
PAWTUCKET, RHODE ISLAND
SUBSIDIARY OF
PRATT & WHITNEY
DIVISION NILES-BEMENT-POND COMPANY

PRECISION PRODUCTION TOOLING — FOR MORE THAN FIFTY YEARS

FACTS ABOUT Exide®

IRONCLAD® INDUSTRIAL TRUCK BATTERIES



DOING A GIANT'S WORK AT LOWEST COST WITH EXIDE-IRONCLADS

STEEL MILLS USE GIANT **EXIDE-POWERED** RAM TRUCKS TO HANDLE HUGE COILS OF SHEET STEEL WEIGHING AS MUCH AS 30 TONS EACH. THEY WORK FULL-SHIFT WITHOUT COSTLY DOWN-TIME DELAYS -AROUND THE CLOCK. **EXIDE** DEPENDABILITY AND EXCEPTIONALLY LONG USEFUL LIFE RESULTS IN LOWEST HANDLING COSTS PER TON.

BATTERIES ARE WORKED TO DEATH BY EXIDE ENGINEERS TO LEARN SECRETS OF LONGER LIFE

SINCE 1910, RESEARCHERS HAVE GREATLY IMPROVED EXIDE-IRONCLAD PERFORMANCE AND USEFUL WORKING LIFE, BUT THE BASIC IRONCLAD PRINCIPLE OF TUBULAR CONSTRUCTION REMAINS THE SAME.

LAB TESTS OF IRONCLADS AGAINST CONVENTIONAL TYPES OF BATTERIES SHOW THAT THEY GIVE BETTER PERFORMANCE... **AND FROM 20% TO 30% LONGER LIFE!** THESE TWO FACTS, DEMONSTRATED BY THOUSANDS OF BATTERY USERS, ARE THE REASON WHY...

- PROTECTED CONDUCTING GRID
- COMPRESSED ACTIVE MATERIAL
- SLOTTED RETAINER TUBE
- IRONCLAD POSITIVE PLATE

EXIDE-IRONCLADS ARE YOUR BEST POWER BUY ***AT ANY PRICE!***

LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS ❷ WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

Galvanizing Co., secretary-treasurer.

REPRESENTATIVES

Reid Brothers Co. Inc., Beverly, Mass., appointed Gute Co., Milwaukee, as representative for its surface grinders in that territory.

Omer E. Robbins Co., Detroit, appointed Machinists' Tools Inc., Buffalo, as sales representative for magnetic sine tables and nonmagnetic sine plates for angular grinding and inspection operations.

Firth Sterling Inc., Pittsburgh, appointed the following distributors: Cutting Tools & Supplies Inc., Pontiac, Mich.; Complete Industrial Supply Co., Tucson, Ariz.; Utility & Industrial Supply Co., Jackson, Mich. They will handle tools, tips and blanks, high-speed tool bits, drill rods and ground flat stock. Cutting Tools & Supplies Inc. also distributes Firth Sterling's line of high-speed steels, hot and cold work die steels and carbon steels.

James M. Motley & Co. Inc., New York, were appointed export distributors for the engine and gap lathes manufactured by **Nebel Machine Tool Co.**, Cincinnati.

McKay Co., Pittsburgh, appointed Williams & Wilson Ltd., Montreal, Que., distributors for McKay electrodes. The Canadian company carries the complete line of McKay mild steel, stainless steel, hard surfacing and special purpose electrodes. McKay bare wires in mild steel and stainless steel are available for manual and automatic welding.

Ampco Metal Inc., Milwaukee, was appointed by St. Catharines Brass Works Ltd., St. Catharines, Ont., as a distributor of its stock products. Ampco also appointed Hays Supply Co., Memphis, Tenn., as distributor for its centrifugal pumps. The following have been appointed distributors to handle Ampco's line of electrodes and accessories: Brady Supply Corp.,

(*Please turn to page* 112)

Broderick & Bascom reeling machine, showing 5-ton reel now turned by Twin Disc 8.4 HYDRO-SHEAVE on 3 hp 1200 rpm motor. Twin Disc Fluid Couplings are available in 10 different models, sizes 7.4 to 27, with the broadest variety of input, output combinations to match hook-ups on practically any motor or engine installation from ¾ to 850 hp.

How to overcome starting problems

With mechanical drive on their reeling machines, Broderick & Bascom Rope Co. had a problem. In rewinding ¾" wire rope from 5-ton reels down to smaller reels, operators had to "inch" the heavy starting loads to prevent overrunning. Inevitably, heavy current surges occurred. Chains jumped their sprockets. Gears broke. Motors overheated. The wire rope was stretched, impairing product quality.

The solution? *Elimination* of mechanical drive, with *Twin Disc Fluid Couplings*—designed for the *job*.

Twin Disc HYDRO-SHEAVE® Drives were selected and slipped quickly, easily onto the motor shafts. The problem was *solved*.

The HYDRO-SHEAVES pick up the heavy starting loads smoothly, while the motor accelerates quickly—*eliminating* need for "inching." Reels no longer over-run. Slack is gone from the start. Chain-jumping, gear-breaking, motor overheating are eliminated. The wire rope no longer stretches and product quality is *protected* . . . through smoother, steadier operation.

If you have a mechanical drive problem—with *either* motor- or engine-powered industrial equipment—*why not solve it the Twin Disc way?* Write Twin Disc, Dept. DS, Racine, Wisc., *today*, for new Fluid Coupling Bulletin 144-D.

TWIN DISC

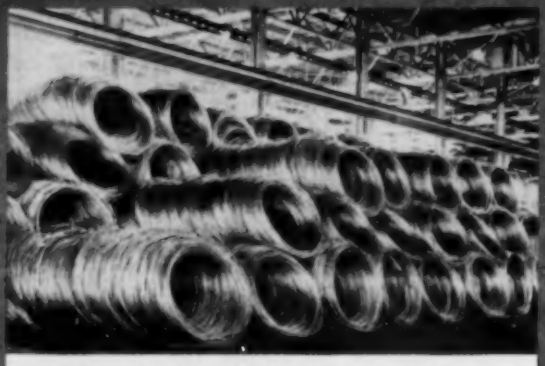
TWIN DISC CLUTCH COMPANY, Racine, Wisconsin
Hydraulic Division, Rockford, Illinois

Products of Sixty-Seven Years of Pioneering in Aluminum

Your Alcoa Distributor is as near as your telephone and his warehouse is stocked with the aluminum products you need for fast, economical production. His facilities include modern equipment for sawing, shearing and slitting stock to your specifications and for making prompt deliveries.

EXTRUDED SHAPES: For thresholds; window sills; door frames; glass stops; copings; gravel stops; trim; truck bodies. Also angles; channels; tees; zees; etc., for structures.

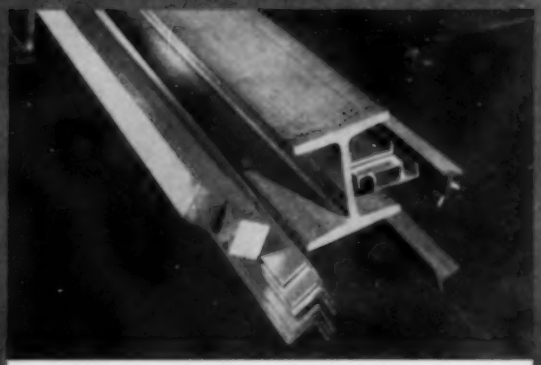
TUBE AND PIPE: Coiled tube; Alcoa® Utilitube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.



WIRE: Coiled and straight length; flattened wire; rivet wire and rod for die heading operations in manufacture of rivets, nails, bolts and screws.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA



ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; tees; zees. Suited to a variety of structural applications.

SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.

BAR STOCK: Square, hexagonal and rectangular in all commercial alloys. Rolled and cold finished to final dimensions for superior tolerance and finish.

SCREW MACHINE STOCK: Available in 2011-T3 (formerly 11S-T3), the free-machining alloy, and 2017-T4 (formerly 17S-T4), a higher strength alloy, plus 2024, 6061 and 7075 (formerly 24S, 61S and 75S).

FASTENERS: Machine screws, wood screws; washers; nuts; bolts; rivets. Recommended for fastening aluminum to prevent electrolytic damage.

WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.

Which of these jobs gives you trouble?

Oakite has 6 new ways to help you

Oakite chemists have developed efficient new materials for the six important jobs listed below. One of these new materials may provide the perfect solution for your most difficult problem.

1 **HEAVY-DUTY CLEANING IN TANKS:** New material combines the best qualities of alkaline and solvent cleaners.

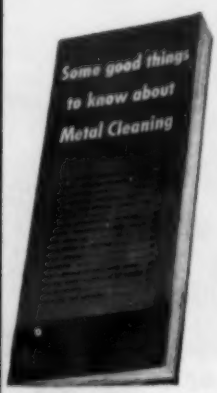
2 **PHOSPHATE COATINGS:** One material cleans steel while applying dense iron-phosphate coating. Another surpasses government specifications for heavy zinc-phosphate coatings. Lasting paint adhesion, protection against corrosion, ease of control.

3 **ETCH-CLEANING ALUMINUM:** Uniform etching in preparation for anodizing or painting. Scaling and sludging minimized or eliminated.

4 **ELECTROCLEANING BRASS:** Efficient, economical cleaning without danger of tarnish.

5 **INHIBITING PICKLE BATHS:** Liquid inhibitor for sulphuric, hydrochloric and phosphoric acids. Saves steel, saves acid, builds own foam blanket to suppress pickling fumes. Easy to add to continuous strip or batch pickling operations.

6 **STRIPPING PAINT:** Two solvent strippers for synthetic enamels and other tough finishes. One so viscous it adheres to vertical surfaces of objects that can't be stripped any other way.



FREE

Circle the coupon number corresponding to the job that gives you trouble. We'll send information about the new material for the work, also our 44-page illustrated booklet "Some good things to know about Metal Cleaning."

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. and Canada

OAKITE PRODUCTS, INC.
38H Rector Street, New York 6, N. Y.

Send me a FREE copy of "Some good things to know about Metal Cleaning" and tell me more about the new Oakite material for the job (jobs) corresponding to the number (numbers) I've circled below.

1 2 3 4 5 6

Name_____

Company_____

Address_____

(Concluded from page 109)

Elmira, N. Y.; C. D. Genter Co., Chattanooga, Tenn.; Keen Machinery Co., Cincinnati; Walter Pestrak, Cortland, O.; and Georgia Supply Co., Jacksonville, Fla.

R. K. LeBlond Machine Tool Co., Cincinnati, appointed Balbach Co., Omaha, Nebr., as sales distributor for the eastern half of Nebraska and western Iowa.

Calumet & Hecla Inc.'s Wolverine Tube Division, Detroit, appointed R. M. Fritz as sales representative in Oklahoma and north Texas. His headquarters will be in Wolverine Tube's Oklahoma office.

Viking Tool Co., Shelton, Conn., appointed Gierston Tool Supply Co., Elmira, N. Y., and Nelson R. Church Co., Pawtucket, R. I., as distributors. John Drew of Fairfield, Conn., will continue to handle distribution in Connecticut.

NEW ADDRESSES

Samuel M. Langston Co., manufacturer of machinery for the corrugated container industry and paper mills, moved its executive offices into a $250,000 addition to its Camden, N. J., plant.

Graybar Electric Co. Inc., New York, moved its Cleveland branch to 1100 E. 55th St.

United Mfg. Co. moved its production and administrative facilities from Bedford, O., to 3637 W. 56th St., Cleveland. The move more than doubles the firm's capacity for manufacturing axles, retractable landing gear equipment and brake controls.

Purchasing activities of **Orinoco Mining Co.,** U. S. Steel subsidiary, have been discontinued at 25 Broad St., New York, and transferred to 525 William Penn Place, Pittsburgh 30.

Atlas Powder Co. moved its general offices to Concord pike and New Murphy road, Wilmington 99, Del.

4-HIGH REVERSING

ROUGHING STAND

FOR

HOT STRIP MILL

designed and built by

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at • Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington (Labdell United Division)

SUBSIDIARIES. Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

OSTUCO TUBING

REDUCED DRILL ROD WEIGHT 20%

TO GIVE RIGS A LONGER REACH!

OSTUCO PROJECT REPORT . . . CHICAGO PNEUMATIC TOOL CO.

A well known method of test drilling is faster and more efficient with lightweight drill rod manufactured from 9' 10⅞" sections of internally upset OSTUCO Tubing. Heavy-wall tubing once was considered necessary to prevent breakage at the threaded joint—but its weight shortened drilling depth of more practical, semi-portable drill rigs.

With internally upset OSTUCO Tubing, rod ends are thicker than the tube body which provides needed strength with 10⅛ pounds less weight per section. Dead weight eliminated in the tube body amounts to over 2½ tons per 5000 feet of drilling depth. This permits the use of semi-portable drilling equipment that handles much longer rods because of their lighter weight.

This application may spark an idea for you . . . how to save production time and cost with versatile, *special-quality* OSTUCO Tubing. And you'll be interested in OSTUCO's unique *single-source service*, where one order takes care of all details. Write for catalog, "Ostuco Tubing," or send your blueprints for prompt quotation.

OSTUCO TUBING

SEAMLESS AND ELECTRIC WELDED STEEL TUBING
—Fabricating and Forging

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
Birthplace of the Seamless Steel Tube Industry in America
SALES OFFICES: BIRMINGHAM • CHARLOTTE • CHICAGO (Oak Park) • CLEVELAND • DAYTON • DENVER • DETROIT (Ferndale) • HOUSTON • LOS ANGELES (Beverly Hills) LOUISVILLE • MOLINE • NEW YORK • NORTH KANSAS CITY PHILADELPHIA • PITTSBURGH • RICHMOND • ROCHESTER ST. LOUIS • ST. PAUL • SEATTLE • TULSA • WICHITA
CANADA, RAILWAY & POWER ENGR. CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York

Technical Outlook

THE BIG SQUEEZE—"First of the really big ones to get into operation," says Wyman-Gordon Co., announcing the initial production run on its 35,000-ton Loewy closed-die forging press at the North Grafton, Mass., plant. The Air Force heavy press program giant is forging aluminum wing spars (about 10 ft long) for the Convair, delta-wing, F102 interceptor.

ATOMIC BUSINESS—Last year Babcock and Wilcox said it anticipated making complete nuclear steam generators to turn out electric power. Last week the company announced it was constructing what it believed to be the first privately financed major plant for the manufacture of fuel elements and other reactor core components for the nuclear power industry.

BEATING THE DRUMS—Hard after more business, the Steel Shipping Container Institute points out that its members manufacture more than 125 million steel containers and consume over 1 million tons of sheet steel annually, second only to the automotive industry. The total would be bigger if it weren't for the lasting qualities of steel drums for which there is a thriving reconditioning business.

GROWING CARBIDE—Firth Sterling Inc. is expanding its carbide division. Reason: Growing market in the atomic power and chemical industries. Big gains are expected for chromium carbide which has high resistance to oxidation, abrasion and chemical corrosion and a high coefficient of thermal expansion compared to other carbides.

LOOKING FOR BUSINESS—What the titanium melters really need at the moment is orders, says James A. Roemer, president, Mallory Sharon Titanium Corp., Niles, O. Orders on the books are at a low point. Help may be forthcoming says John H. Garrett, chairman, steering group on titanium research and development, Department of Defense. As part of a new four-point program, the government may start buying moderate quantities of titanium mill products for testing and to expand fabrication know-how. The government is now buying sponge for the revolving stockpile.

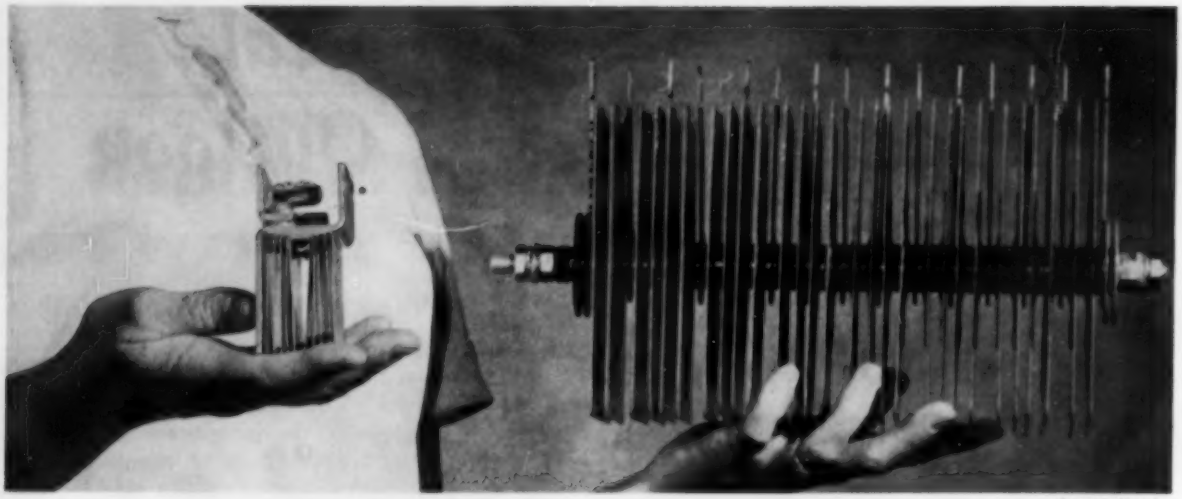
TIGHT LIP—A crucible spout that won't come loose during pouring gets its hold-tight qualities from a dovetail joint which is foolproof even if cement loosens, says Electro Refractories & Abrasives Corp. Spouts and crucibles are shipped disassembled. The customer puts them together himself.

CLEAN BURN OFF—A new series of rust-preventive fluids for coating metal parts before storage can be removed with solvents, scoured off with water and burned away without leaving a residue to interfere with painting, welding, soldering, brazing or annealing.

GETTING BIGGER—Surface Combustion Corp. says it's building the world's largest slab-heating furnace for Weirton Steel Co. Each hour each of the three furnaces will reheat 200 tons of steel slabs to rolling temperature.

QUIET TRANSFORMER—By measuring magnetostriction (expansion and shrinkage of steel in a magnetic field) with supersensitive micrometers, Allis-Chalmers sees a cure in sight for transformer noise. As answers become clearer on how steels respond to magnetic fields, there's a possible tie-in with steel mill practice. Object: To roll in the right magnetostriction qualities for reduced noise.

Metalworking Outlook—p. 67 *Market Outlook—p. 161*



General Electric

Twelve ounces of germanium rectifier. It has the same capacity as the 2 kw selenium stack at right

Revolution in Rectifiers

Germanium was billed as the electrical wonder of tomorrow, but tomorrow got here sooner than expected. Now comes silicon, and the rectifier picture looks even brighter

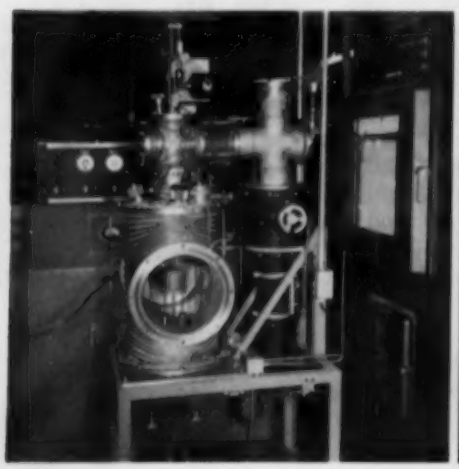
By VAN CALDWELL
Associate Editor

A MOST UNCOMMON material, germanium, is competing with one of the commonest, silicon, in a race for electrical honors. The winner is sure to be any industry that uses rectified power in the 10 to 500-volt range.

You can count on them both overtaking other metallic rectifiers, mechanical rectifiers, electronic tube rectifiers and motor generator sets in many applications. Possibilities cut right across industry: Aircraft communications equipment, television power supply, electroplating, arc rectification, anodizing, titanium arc furnaces, industrial power supplies.

You can buy a germanium rectifier for $100 to $200 a kilowatt depending on voltage. It might cost you 30 to 40 per cent more than a comparable selenium rec-

Vacuum furnace for making large single crystals of germanium and silicon



Silicon wafer beside an average size silicon crystal. This wafer will become the heart of a rectifier

Du Pont

Semiconductor grade silicon. It costs $380 a pound, but a little goes far

General Electric

Zone melting furnace, here used for refining silicon. Germanium for rectifiers is refined this way, too

tifier today, yet there's plenty of evidence that germanium (and later silicon) will be cost competitive by virtue of outstanding efficiency and reduced maintenance.

More Than a Dream—Germanium rectifiers already at work or about to be installed include a 24-v, 40,000-amp unit for an anodizing line; a 65-v, 16,000-amp unit for a hydrogen-oxygen cell; a 40-v, 8000-amp unit for an arc melting furnace. One germanium rectifier installation in operation at the Metal & Thermit Corp., San Francisco, is supplying direct current at 800 amp and 125 v in the reclamation of tin from tin plate.

General Electric Co. made these new rectifiers, among the first in the field. Some of its germanium units have been on life test more than three years.

Others will be getting in the act soon. Westinghouse is producing developmental quantities of both germanium and silicon rectifiers, with silicon appearing to be the favorite of the moment. Raytheon, Sylvania, RCA, Hanson - Van Winkle-Munning, Rapid Electric and Udylite are all in the picture.

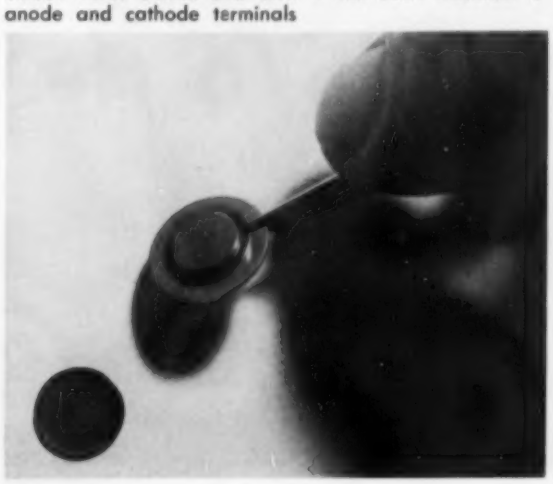
Change-over No Cinch—It is no easy task for these old hands in the rectifier business to shift to germanium and silicon. To make good rectifier cells, germanium and silicon metal must be refined 99.99999 per cent pure. That's metallurgy close to unbelievable.

Purification of germanium is accomplished by zone melting, the

Where germanium and silicon rectifiers will be used

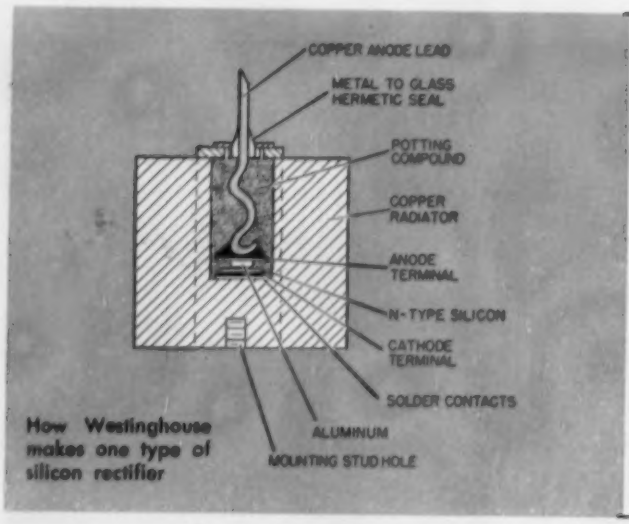
Electrochemicals
Electroplating
Arc furnaces
Battery charging
Anodizing
Sintering furnaces
Electrolytic tinning
Adjustable-speed motor drives
Aircraft

Silicon wafer before and after it has been soldered to anode and cathode terminals

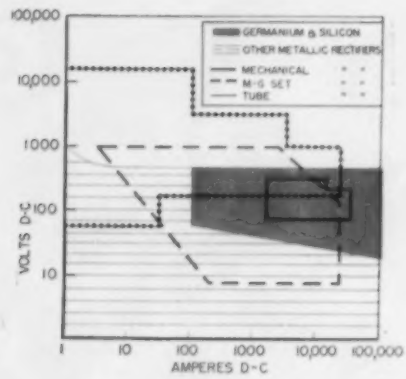


Silicon rectifier capable of delivering power output of more than 1200 w, enough to run a 1½-hp motor

Westinghouse



How Westinghouse makes one type of silicon rectifier



Where germanium and silicon fit in the rectifier picture

principle being to pass a molten zone repeatedly along a bar. The molten zone, obtained by induction heating, sweeps impurities along with it, concentrates them in one end of the bar which is later cropped. Westinghouse finds the semiconductor-grade of silicon it buys from Du Pont is pure enough for rectifier use, but could refine it further by zone melting.

Controlled Adulteration—After purification, about 0.1 part per million of a proper adulterant must be added. Arsenic is one adulterant used. Then, in helium gas a single crystal as large as 1½-in. in diameter and several inches long must be grown by slowly withdrawing a seed from a crucible of the molten metal.

While the crystal is being grown, the melt must be maintained at temperatures of 936 ±0.5°C for germanium and 1420 ±1° C for silicon. Furthermore, the rod on which the crystal grows must be rotated and withdrawn from the melt at a critical rate—otherwise, the crystal will be nonuniform in diameter and have other undesirable qualities.

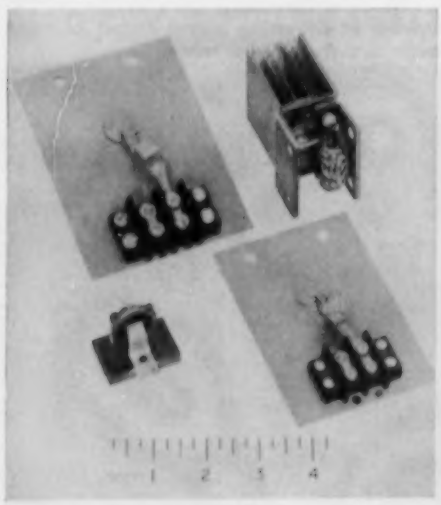
Sandwich Cell—Finally, the finished crystal of germanium or silicon must be sliced across the grain into wafers about 0.015 in. thick. But still other steps are necessary before these rectifying slices can be hooked into a circuit. Westinghouse, for example, seals the germanium in a sandwich between slices of molybdenum for strong support and good heat conduction.

In the Westinghouse wafer, germanium is fused to molybdenum on one face by a 3-mil layer of pure indium solder, on the other by 3 mils of pure tin solder (GE uses antimony). These maintain the electrical properties of the germanium.

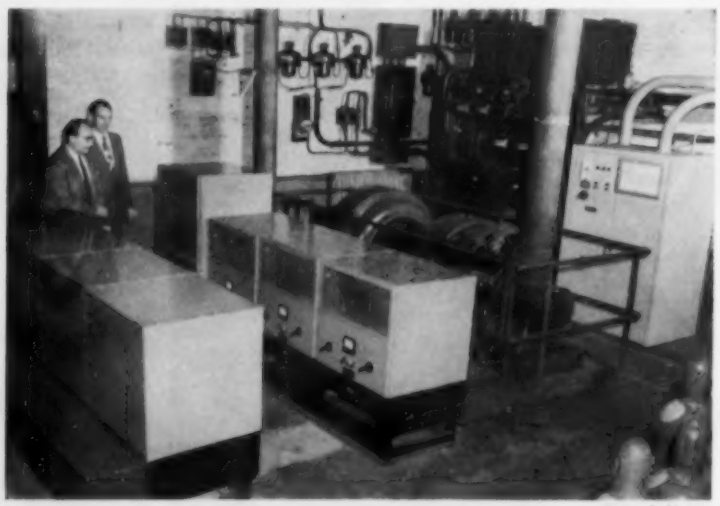
Reason Enough—Obviously, no company is going to all this trouble on a production scale without good reason, especially with the market price of silicon metal running about $380 a pound and germanium $300 to $900 a pound.

The answer lies in the great rectifying potential of these metals. In the nearly pure state they are

Half-wave-type germanium power rectifiers made by GE and rated from 0.4 to 75 dc amp



Germanium rectifiers for electrolytic oxy-hydrogen plant at GE's Lynn River Works. They supply 2100 amp at 125 v, dc



General Electric

superior semiconductors. When an alternating current is passed through a properly formed contact they act as one-way valves.

Forward flow of the current slips through with almost no restriction; backward flow is opposed with great resistance.

Real Efficiency — Germanium and silicon rectify with a close-to-phenomenal efficiency. Some germanium rectifiers reach 99 per cent efficiency. Counting transformer losses and power for cooling, efficiency runs better than 94 per cent at 65 v dc. Compare this to 80 per cent for new selenium rectifiers (their efficiency drops with age) and 85 per cent for motor generator sets at the same voltage.

At a current density of 300 amp per sq in. of rectifying surface, germanium has less than a ½-v drop in the forward direction, silicon about a 1-v drop. Selenium, by contrast, shows a 1-v drop at 0.33 amp per sq in. loading; i.e., germanium can carry over 100 times the current density of selenium with half the voltage drop.

Eliminate the Negative — For blocking current flow in the reverse direction, these rectifiers also shine. Germanium is especially good, having a reverse-to-forward resistance ratio on the order of 1,000,000 to 1.

Plenty of Ability—Some idea of what these little wafers will do can be gathered from units already developed. GE, for example, has a germanium cell with a rectifying surface about the size of a dime. In an air-cooled mounting with heat radiating fins it takes up 8 cu in. of space, weighs 12 oz and will handle a 2-kw load continuously. An equivalent selenium cell would be 40 times as large, weigh 4 times as much.

Recently, GE installed six 25-kw germanium rectifiers in its Lynn River Works. They are connected in parallel to give 150 kw at 1200 amp and 125 v dc. They furnish constant current to a line of 40 Kent cells where hydrogen is made for the plant's furnaces.

No Attention—Actually, the rectifiers furnish only half the hydrogen cells' power requirements. The other half is furnished by a motor generator set which suffers by comparison. The operator must adjust a field rheostat on the motor generator set every half hour because temperature changes in the Kent cells cause resistance changes, but once set to the desired current level, the germanium rectifiers need no attention.

The 25-kw units just described can be fed from any 208, 230 or 460 v, 3-phase source. By connecting the outputs in series, or in parallel, direct-current loads or current requirements of wide range are possible.

Critical Cooling—These particular rectifiers are blower cooled. Other liquid-cooled units with heat exchangers are rated as high as 260 kw, 65 v, 4000 amp. Water-cooled units also are being made.

The necessity for liquid or air blast cooling points up one of the critical features of wafer-type rectifier cells. The small volume of the wafer gives it little thermal capacity. For high current demands, it is difficult to find effective ways to keep the wafer cool. Here silicon makes one of its chief claims. Germanium rectifiers should not be operated above 150° F, but silicon ones will operate well at temperatures to 350° F, making them especially valuable for aircraft use.

Crystal Ball — Everyone has heard about germanium transistors. Their glamor has pretty much obscured the rectifier picture. Now it appears that there may be a wedding between the two. John L. Boyer, manager of rectifier development at Westinghouse, predicts eventual development of power transistors capable of carrying hundreds of amperes. These could lead to power rectifiers made as transistors to control as well as rectify output voltage. A high-efficiency, direct-current transformer employing transistors already is a reality.

If you are contemplating direct-current equipment, now would be a good time to make inquiries among rectifier makers. There's still plenty of opportunity to be a germanium or silicon pioneer. In return, you may discover rectifying efficiency you didn't dream possible.

Water-cooled germanium rectifier cell. The rectifying wafer lies in the center of the cell

Water-cooled germanium rectifiers undergoing laboratory tests at the Westinghouse East Pittsburgh plant

Westinghouse

New Carbide Starts with Titanium Metal

THE RESEARCH program started as an investigation of problems in machining steel, among them cratering of cutting tools. Along the way it turned up a better method for making titanium carbide.

Titanium carbide is a common component of carbide tools. Conventional grades of cemented carbides for machining steel contain it because it resists cratering action of continuous chips. Usually it is incorporated as mixed crystal, a solid solution of tungsten carbide in titanium carbide.

Lost Strength—But even in the purest mixed crystal, some of the strength of tungsten carbide is lost—one reason why straight tungsten carbide tools are preferred for some applications. Because mixed crystal has the titanium carbide crystal form, its properties strongly reflect the purity, especially the oxygen content, of that ingredient.

Controlling oxygen contamination has always been a problem. Commercial titanium carbide is usually made by a simultaneous reduction and carburizing process under vacuum and high temperature. In the reaction, the large quantity of carbon dioxide evolved makes it impossible to maintain a high vacuum. The reaction between the TiC and TiO_2 stops before all the oxide is reduced, and there the oxygen sticks.

Worse yet, there's no simple way of determining beforehand how much oxygen will be left, with the result that each batch of carbide is different.

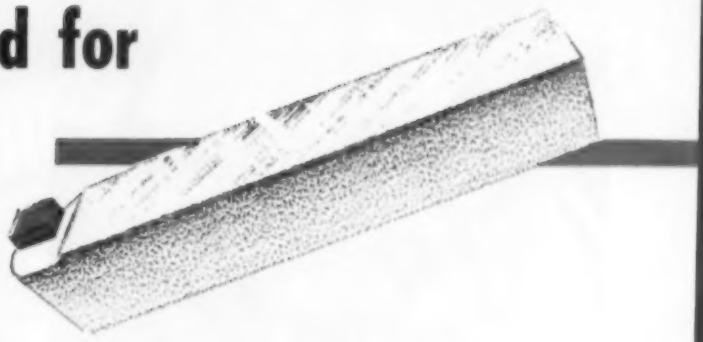
Carbide from Metal — Carmet Division of Allegheny Ludlum Steel Corp. eventually gave up attempting to make a uniform titanium carbide by conventional methods. Instead, the metallurgical department decided to make the carbide by carburizing metallic titanium. That licked the oxygen problem, but added an economic one: Titanium metal is a lot more expensive than titanium dioxide.

That problem virtually solved itself when pilot-scale high vacuum equipment was put to work turning out carbide by the new method. It proved so much simpler, the product so much better, that there wasn't any turning back.

Carmet is now making the new carbide in production quantities. They say it has better solvent properties for tungsten carbide, makes possible a mixed crystal which contains less titanium carbide and will not dissociate at sintering temperatures. The solid solution has been named Crystalloy.

High vacuum possible in making titanium carbide by carburizing titanium metal is one of the key factors in the manufacture of Crystalloy. To exclude oxygen and hydrogen in further processing steps, this vacuum furnace is used to sinter carbide tools containing Crystalloy

Cratering Reduced for Carbide Tools



FROM A PROGRAM that started as an investigation of machining problems, a new series of carbide cutting tools has evolved. They grow out of an unusual commercial method for producing titanium carbide developed by Carmet Division of Allegheny Ludlum Steel Corp. (See opposite page.)

Basic ingredient of the tool series is Crystalloy, Carmet's high-purity solid solution of titanium carbide and tungsten carbide. Tools incorporating it have been designated the "600" series.

The Series — Grades "CA-608" and "CA-610" introduce the series. The last two digits of each grade number indicate cobalt content, an approximate index of the service for which each grade is intended. Grades are being made in standard tips and tools, but can be made in special shapes.

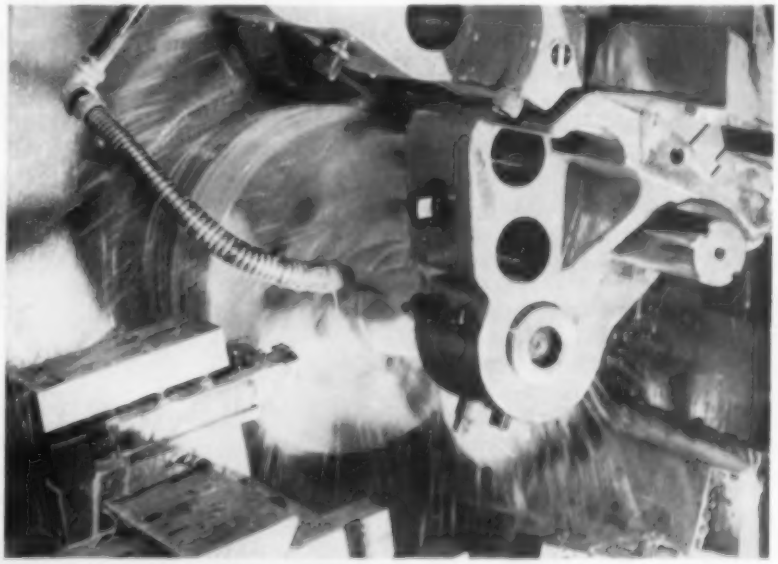
CA-608 is for light machining and finishing where conditions limiting tool life are edge wear and cratering. Intended for use at increased speeds and decreased feeds, it is designed to withstand shock loads of finishing cuts in steel where the chip is continuous and cratering a problem.

CA-610 is for heavy cuts where breakage is the limiting factor. Cuts over 0.25 in., feeds over 0.015 in. and lowered cutting speeds are the aim of this grade which has high red hardness and high resistance to impact and vibration. It offers the possibility of carbide tooling on machines that have been considered too slow or not rigid enough for carbide.

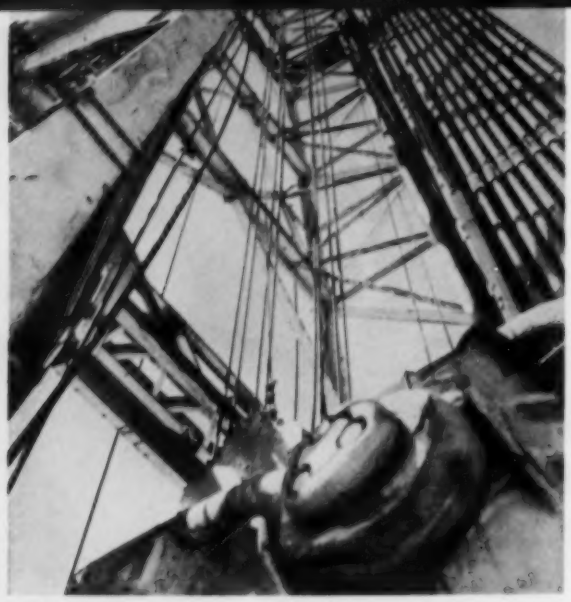
Hard at Work—A Chicago firm is machining 52100 steel forgings with CA-608: Depth of cut 0.15 in., length of cut 8½-in., feed 0.018 in., speed 290 sfm. In former steel cutting grades used on this job, cratering caused edge breakdown after 12 pieces. After shifting to 608, the number of pieces machined between grinds rose to 18, a 50 per cent increase. There was little cratering.

Carmet CA-610 has been planing a big weldment of C-1020 steel at G. A. Gray Co., Cincinnati. Intermittent cuts up to 36 ft long were run at ½-in. depth with 0.078-in. feed at 250 sfm. Performance and tool life are reported good in this application where carbide tooling is standard.

At Lake Erie Engineering Corp., Buffalo, CA-610 is being used on a vertical boring mill. The job is a flame-hardened casting for a resistance platen insert that has been heat treated to 325 Brinell. Machining takes 30 hours at 30 rpm, 0.20 to 0.25-in. feed and 0.25-in depth of cut. Average tool life on this job is 10 hours between grinds.



Buxton Machine & Tool Co., Buffalo, is using CA-610 on 4140 steel heat treated to a tensile strength of 150,000 psi. In a Warner & Swasey 2-AC chucker running at 134 rpm and 0.009-in. feed, machining time runs about 6½-minutes per piece and tool life 50 pieces between grinds



Quick to obtain supplies of the new rope, oil and gas industry experts predict it will help them reach new depths. Longer tool lines mean much heavier lifts

Wire Rope Strength Goes Up

Called the most important change in 35 years, new grade has average strength of 300,000 psi. With the added strength comes greater toughness and service life, too

PUTTING 15 per cent more strength into a wire rope involves more than beefing up the alloy or drawing to higher tensiles.

"It's not that easy," says American Chain & Cable Co., one of several ropemakers which recently announced a new rope to the trade. "You can boost the strength, but one of the big obstacles has always been a proportionate decrease in wearing and flexing qualities when strength goes up."

Good News—So a 15 per cent stronger rope that lasts twice as long in the most grueling jobs is quite an accomplishment. American Chain tells of one dragline application where the toughest ropes used to last about 80 hours. With the new ones, they're averaging 170 to 200 hours.

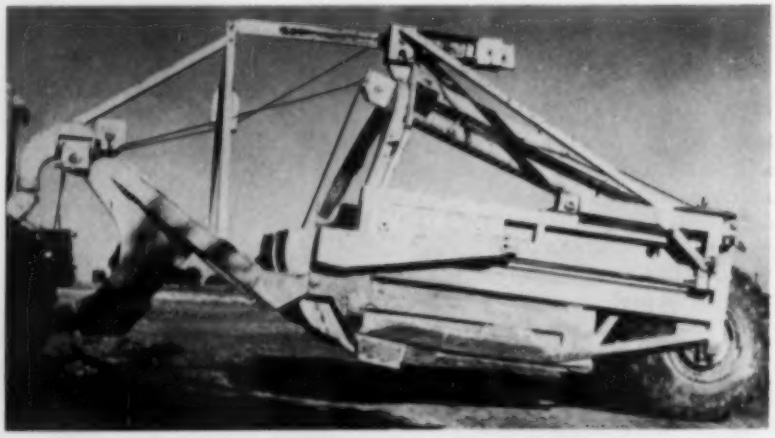
In an open pit shovel hoist installation, where both rock and ore were being dug, shovels equipped with the new ropes dug 822,286 tons in five months before requiring replacement. The record racked up by previous top-quality ropes was 329,437 tons.

The Secret—Actually, this superstrength rope has been used for years by the Navy, both in its shipboard catapults and in aircraft arresting gear for carriers. Years ago, ropemakers noticed superior strength was achieved from certain heats of improved plow steel, which is recognized as the best rope-making steel. When carbon content was on the high side and when the steel was free of residuals, its strength and wearing qualities were apparently improved.

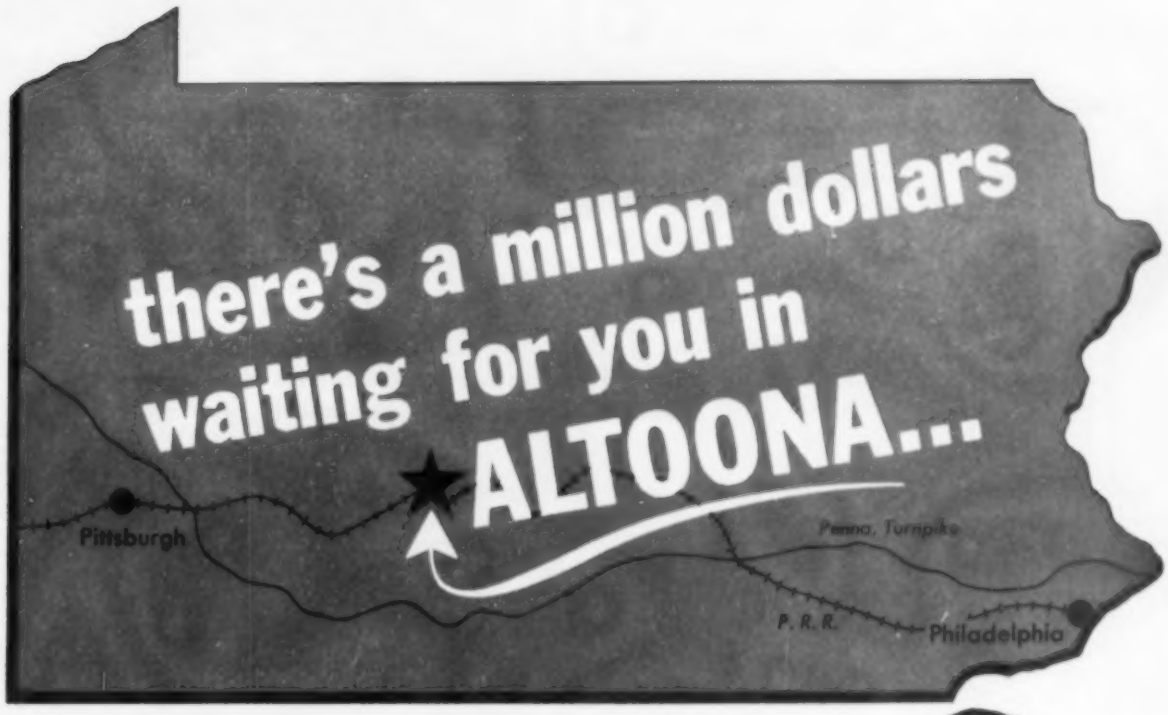
But steelmakers weren't able to hold consistently to those requirements without a premium price, so manufacturers weren't able to market this superproduct until recently. Now with steel technology improved, the mills can offer greater tonnages of the steel without prohibitive extra charges.

Applications—Aside from the heavy-duty construction, mining and logging applications, where downtime for rope changes is usually more costly than the new rope, the new grade is expected to simplify use of wire rope in general. Its "more strength per size" feature opens up new design possibilities for manufacturers of power equipment, permitting smaller diameter sheaves, drums and booms.

Taking immediate advantage of the extra strength in the same diameter rope is the oil and gas industry. With the trend to deeper wells, the derrick must lift greater tool lengths. As the strength limits of the rope are approached, tool lifting becomes slow and cautious. Extra strength will enable drillers to greatly speed up the nonproductive tool change time, enabling them to drill deeper wells economically.



The 15-per-cent boost in strength means a lot on this heavy-duty scraper. Operators report much longer service life and fewer rope breakages



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O_2 Blast Enrichment Shortens Blowing Time

High purity oxygen is becoming a more important tool to the steelmaker. It can answer the problems of higher phosphorus operation and shorten open-hearth time

USE of oxygen in steelmaking has proved its usefulness in the United Kingdom—in refining in the arc furnace, in the partial purification of pig iron before feeding to the open-hearth furnace under certain circumstances (especially where there is no active mixer) and in speeding up the refining of low-carbon steels in open-hearth furnaces.

Development of oxygen in steelmaking in England has been limited because successful applications have not justified the use of tonnage plants to supply oxygen of 96 to 98 per cent purity. For instance, speeding up the refining of even 18,000 tons of steel per week would only consume 13 to 15 tons of oxygen per day. This is not enough for a tonnage plant, but too much for the economic use of evaporated oxygen. One solution is the establishment of tonnage oxygen plants adjacent to groups of steelworks. Because engineering demands account for up to 30 per cent of the total demand for such gas, generators should produce high-purity gaseous oxygen. While small scale oxygen plants could be designed to produce as little as 10 tons per day, the economic benefits of large scale operation are marked. Four times the oxygen could be produced if capital investment were doubled.

Oxygen Shortens Blow — In a large number of works in Germany, oxygen is used for enrichment of the blast of Thomas converters. The mean nitrogen content of the steel and its final phosphorus content are reduced. Iron containing less phosphorus than normal can be blown successfully to a tapping temperature.

With oxygen enrichment the blow is also shorter, and a higher recovery of metal is obtained from a larger addition of iron ore during the blow. Oxygen consumption is about 1000 cu ft per ton of steel which raises the oxygen content of the blast to 30 per cent. Desiliconizing by preblowing also is carried out.

At Hagen-Haspe, Germany, and Esperance-Longdoz, Belgium, the nitrogen content of the blast is not diluted by adding more oxygen. During the final stages, the converter is blown with a mixture of oxygen and superheated steam, which is nitrogen free. In this way, the final nitrogen content of the steel is brought below 0.0025 per cent. Both of these mixed blast processes consume about 18,000 cu ft of oxygen per ton of steel. In a plant producing only 5000 tons of steel per week, the oxygen demand will amount to over 50 tons per day.

Oxygen-Blown Steel — Another process, the "L-D," is used in Austria. Thirty-ton converters are used with no bottom tuyeres. A single jet of 98 per cent pure oxygen is made to impinge onto the surface of the bath through a water-cooled nozzle which is introduced through the mouth of the vessel. The blast is introduced at the rate of 3000 cfm at 250 psi. This process offers the following advantages:

1. Apart from the tonnage oxygen plant, the capital cost is low.
2. Low-nitrogen steels may be produced without recourse to superheated steam or CO_2 as blast diluents.
3. Irons of a chemical analysis hitherto considered unsuitable for either acid or basic converter steelmaking processes can be refined successfully.
4. Phosphorus may be oxidized in the L-D vessel during (sometimes substantially before) the oxidation of carbon. So metal may be duplexed for the removal of silicon and a substantial proportion of the phosphorus, without complete loss of the carbon and consequent elevation of the melting point.

Application of these, or related principles, might produce economically the low-carbon, low-phosphorus and low-sulphur and low-nitrogen steels required for continuous strip rolling—in spite of the deterioration of quality blast furnace materials and the 2.5 per cent of sulphur which open-hearth fuel oil often contains.

Oxygen in Open Hearths—Inland Steel Co., Indiana Harbor, Ind., uses 150 tons of oxygen per open-hearth furnace per day for enrich-

COMING IN STEEL

The Austrian process for making steel by impinging high-purity oxygen onto a bath of hot metal and scrap is now a part of American steelmaking practice. McLouth Steel Corp., Detroit, and Dominion Foundries & Steel Ltd., Hamilton, Ont., both report amazing success. The Apr. 4 issue of STEEL will take you behind the scenes at both installations where higher quality steel, faster production and lower costs are rewarding these pioneers.

LONGFELLOW'S
VILLAGE BLACKSMITH

Dear to the heart of every small town boy was the shop memorialized in Longfellow's Village Blacksmith, pictured here from an old woodcut. As late as fifty years ago, the smithy was the focal point of rural America's metalworking industry.

Crafts and craftsmen through the ages

NUMBER THREE OF A SERIES

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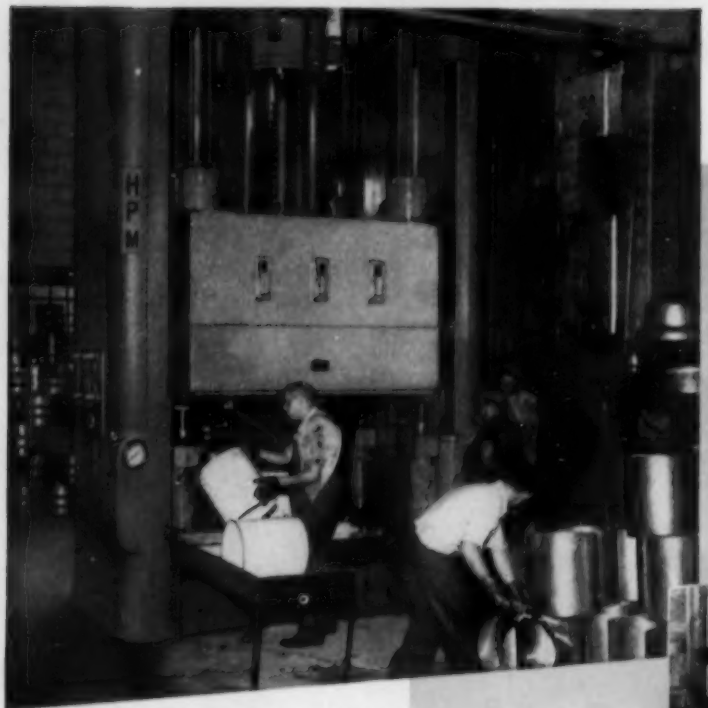

This H-P-M all purpose press performs drawing, blanking and bulging operations — dies are quickly interchangeable—a bulging operation is shown above.

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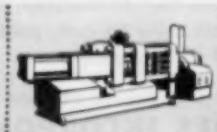
METAL WORKING PRESSES

PLASTICS MACHINES


DIE CASTING MACHINES

C—PRESSES

POWER EQUIPMENT

ing the air, as well as for decarburization. Output has been greatly increased and refractories consumption has not been unduly severe.

At one open-hearth shop in the United Kingdom it is inconvenient to insert the oxygen lance from the front of the furnace. A special water-cooled gun is lowered through the center of the roof opposite the taphole. Evaporated oxygen is blown through the gun at 200 to 210 psi as soon as the bath is melted and the carbon has reached any point below about 0.40 per cent (above this level of carbon the reaction becomes violent). It is usual, depending on the condition of the bath, to feed either oxide or lime or both just before the oxygen blow commences.

Predictable Results—Operation with oxygen is so predictable that a sample is sent to the laboratory when the blow begins. The quantity of oxygen required is calculated from the carbon analysis. As soon as this amount has been delivered the furnace is prepared for tapping. Other samples are not required as far as carbon removal is concerned. Additional samples are not sent to the laboratory until the tapping sample is taken.

During the oxygen blow, frequent bath temperatures are taken as guides to the oil flow required to supplement the heating effect of the oxygen. This may vary from zero to about two-thirds of the normal oil flow. About 100 to 150 gallons per charge normally are saved.

A reduction in bottom-making time is indicated as a result of using oxygen, probably because of the shorter period during which the hearth refractories are exposed to the most severe conditions of temperature and iron oxide in the concentration in the slag. A reduction of about 20 minutes results.

Concentration Stages Differ—A difference exists in the iron oxide concentration in the tapping stage of oxygen blown heats (22.42 per cent) compared with the nonoxygen blown heats (23.9 per cent). Other constituents are not significantly different, but the CaO content of the slag in oxygen blown heats is 42.48 per cent, compared with the lower figure of 40.92 per cent for the nonoxygen heats.

Roof life does not appear to be

Gage design differs from tool design in a great many respects.

Gage Design is a Job For Specialists

Why do some firms insist on putting their tool designers on the spot? Why do they expect these highly-skilled specialists to engineer satisfactory *gages* for special requirements?

There are two reasons. Tool designers have performed wonders in their own field. So their managements understandably have great faith in them. Tool designers, by their very nature, love to solve problems. So, they accept the challenge involved in special gage designing.

It doesn't pay . . . because the experience of the average tool designer does not give him the answers to these questions: Is a *special* gage necessary? *Which* is the best gaging system for the job . . . air, dial indicating, electric, electronic? *How much* will a specially engineered gage cost . . . if required?

Designing machines, fixtures and tools involves holding workpieces in position by force — transferring and transforming power to act as wanted—counteracting heavy stresses and strains.

Designing precision gages, however, requires knowledge of how to magnify and transfer measurement variations precisely, without loss of motion — with a minimum of friction and inertia in the working parts — and a hundred other details which do not concern the usual tool and machine designer.

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Our new booklet "A Management Blind Spot" reveals unappreciated shop situations and tells how they can be corrected. For your copy, write

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Republic's Round Chain Division produces a complete line of welded and weldless chain, fittings and assemblies for the numerous plant operations involving hoisting, hauling, holding, bundling and towing. Or if you require chain for use with the product you make, Republic can supply it. And Republic is the only chain producer who can control quality from raw material to finished product.

Illustrated are some basic chain patterns made by Republic. Each has a specific use. Examine them. They may be just what you need to improve your product or plant operation.

Republic Chain Engineers are available to help you make the right chain selection. Or to help you work out profitable solutions to your chain problems.

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REPUBLIC WELDLESS CHAIN

BUCKEYE—Used for gymnasium and playground equipment, fixtures, suspensions and many other general purpose applications. Furnished in bright, electro-galvanized and hot galvanized standard finishes.

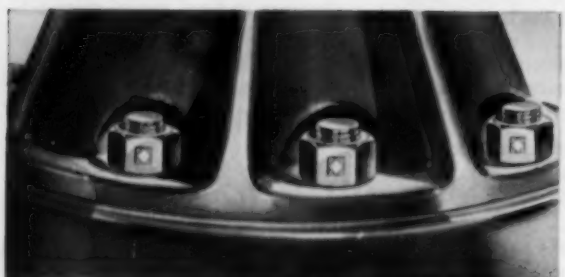
DOUBLE JACK—For ornamental chain, light fixture suspension, toys and other general utility applications. Furnished in standard finishes of bright, electro-galvanized, coppered, nickel plated, brass plated and cadmium plated.

SINGLE JACK—A light chain suitable for uses not requiring high strength, like fixture suspension, anti-loss, etc. Standard finishes: bright; electro-galvanized; hot galvanized; coppered; nickel plated; brass plated; cadmium plated.

SASH—Suitable for the many operations requiring flat metal chain which operates smoothly over pulleys. Furnished in mild steel, stainless steel, bronze. Standard finishes: bright; electro-galvanized; coppered; nickel, brass and cadmium plated.

LADDER SPROCKET—For sprocket wheel drive on small, light mechanisms; toys; ornamental chain and other light general purpose uses. Available in mild steel, high tensile steel, stainless steel. Furnished in standard bright finish.

LOCKWEAVE—For sprocket wheels, valve wheels, overhead doors, ventilators, machinery. Ideal for general utility uses requiring relatively high strength. Available in these standard finishes: bright; electro-galvanized; hot galvanized.



REPUBLIC "NYLOK" NUTS HELP REDUCE ASSEMBLY COSTS by eliminating lock washers, slotted nuts and cotter keys. Yet they assure positive locking in any position, even under severe vibration. Assembly is speeded, too, because either end of the nut is up. No special tools, techniques or lubricants are needed to start them. "Nylok" Nuts can be backed off for maintenance of equipment and re-used. Investigate their use for your product. "Nylok" Nuts are only one of more than 20,000 types and sizes of fasteners made by Republic for all industries.

HIGH DUCTILITY, PLUS ITS PROVED WEIGHT SAVING, may make you want to know more about Republic High Strength Steels. Their application to various products permits weight reduction up to 25%. And when your product is designed and engineered all the way for high strength steel, weight reduction up to 50% is possible. Republic High Strength Steels are ideally suited for use in structural parts for earth moving equipment, truck and gasoline trailers, railroad uses. They resist corrosion, extend equipment life by standing up to rough usage.

A complete line for a wide range of product applications—plant operations

REPUBLIC WELDED CHAIN

PROOF COIL (COMMON COIL)—Standard commercial chain suitable for all ordinary purposes which require welded chain of moderate tensile strength. Regularly supplied in self-colored or hot galvanized finish. Test certificate furnished on request.

HIGH TEST (SUPERSTEEL)—Highly desirable for load binding or other chain applications requiring light weight, strength and long-wearing qualities. Permits the use of smaller and lighter chain. It's made from high carbon cold drawn steel, electrically butt-welded. Standard finish: bright. Test certificates furnished on request.

BBB COIL—Extensively used for purposes requiring chain of better than ordinary quality. Links are shorter than Proof Coil, increasing flexibility and distribution of shock load over a greater number of links. Regularly supplied in self-colored or hot galvanized finish.

ALLOY STEEL—Used in chain sling service and other heavy duty work requiring minimum weight and wear-resistant chain of the highest tensile strength. Links are electrically butt-welded and heat treated giving a tensile strength of 125,000 p.s.i. Made from high quality Republic Alloy Steel. Tested and warranted.

LIBERTY MACHINE—A bright finish chain, twist or straight link, for general use where strength and compactness are required. Other standard finishes: bright, galvanized, and hot galvanized. Can be furnished case hardened in any finish except hot galvanized. Links are electrically welded.

CHAIN SLINGS—Supplied in alloy steel, wrought iron and high test Supersteel. Each is proof tested and warranted for the highest degree of safety. Made in single, double, triple and quadruple sling assemblies. Special slings, assembled with Republic Chain and Chain Fittings, are built to specific requirements.

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World's Widest Range of Standard Steels and Steel Products

WHEN STEEL PARTS REQUIRE TOUGHNESS AND STRENGTH you can depend on Republic Alloy Steels to do the job at the lowest ultimate cost. This "king bolt" on the Caterpillar DW15 Tractor links tractor and scraper or wagon. It has to take the pull, the shocks and the bumps when a tractor drags heavy equipment over uneven ground. Caterpillar uses Republic Alloy Steel for this part. In fact, Republic has been supplying Caterpillar with alloy steels for a good portion of 50 years. And helping them use it to the best advantage.

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K-2250

greatly affected by oxygen heats. Available data indicate roof life of about one or two weeks more than average.

Fast Desiliconization—At another United Kingdom plant, the desiliconization of hot metal is accomplished by pouring 20 tons of hot metal from the inactive mixer into 30-ton transfer ladles containing graded limestone and a little fluorspar. Additional limestone is fed in by hand while the ladle is being filled. Oxygen is blown through a lance into each of two ladles at 250 cfm for 20 minutes. Slag then is decanted and the metal taken to the open-hearth furnace.

The work has been mainly experimental but has shown that about half the initial silicon content can be removed in this way. The advantages to the steelmaker:

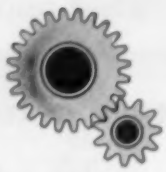
1. The metallurgical load on the open-hearth furnace is reduced.
2. Less wear occurs on steel furnace banks and bottoms.
3. Temperature of hot metal charged is about 250° F greater.
4. Limited quantities of steel scrap can be melted in the ladle.

Consumption of oxygen is 5000 cu ft for each 20 tons of hot metal, or 250 ft per ton.

Lowers Carbon Content—At a third British firm, for example, oxygen is lanced into the bath to take carbon down from 0.22 per cent to 0.024 per cent in about 70 minutes, using 12,000 cu ft of oxygen for 100 tons of steel. The saving in time is at least two hours, with additional savings in fuel and refractories. With oxygen, much lower carbon content (0.025 per cent or so) can be obtained with a much lower Fe content in the slag — 18 per cent compared with 30 per cent when refining is carried out by means of ore. Use of a lance is probably more effective than impingement.

It has been suggested that approximately 1200 to 1400 cu ft of oxygen per ton, fed fast enough to hot metal before charging will desiliconize, considerably dephosphorize and partially decarburize the metal.

Strong evidence indicates that it is technically feasible to make steel from phosphoric iron by top blowing with oxygen, but it is doubtful whether this process would be more economical than the open-hearth for converting phosphoric iron even with cheap tonnage oxygen.



MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

STANDARD MACHINE TOOLS now coming off drawing boards and out of builders' plants will be only second cousins to the ones in your plant.

One of the hottest programs of development in the machine tool industry is focused on the wide variety of standard machines.

At the recent Machine Tool Ball Bearing Conference sponsored by New Departure Div., General Motors, F. J. Garbarino, New Departure's chief engineer, said: "The machines of tomorrow must fulfill five requirements.

"They'll have to work at higher speeds . . . produce work to closer tolerances . . . give better finishes."

In addition, Mr. Garbarino thinks machines must be ready to handle the new metals and will have to operate with a minimum of downtime and service.

Those challenges have been thrown up to builders of standard machines. And this is the new-model year. The machines coming out in 1955 (some were out when the year started) will show builders are well along the improvement road.

There's one more trend in standard machine revision, simplified operation. Machine tool builders apparently are going all out to take the beads of sweat off the operator's forehead (the move ties in with production, of course). Some of the machines could be operated from a chaise longue.

Timing of the huge redesign program is easily explained. First, and foremost, machine user requirements have changed so rapidly since the end of the war that a new set of specifications applies to machine performance. First class example of this is the new, tough-to-cut materials that were just notes on a researcher's pad only a few years ago.

A second explanation for the deluge of new machines is that design programs started right after World War II are off the boards. Now they've been tested and proved and are on the way through production and out the door. (There was little time for redesign during the war, just barely enough for production of existing models.)

Then, too, machine tool sales now are made to a civilian market. As one builder puts it: "The best way to hit that market is to come out with new models which obsolete their predecessors."

The Conference

New Departure's conference at Hartford, Conn., was attended by 200 machine tool management and engineering men. Designed primarily to help solve general ball bearing problems of the machine tool industry, it also helped get answers to specific problems for many of the attending builders. New Departure also feels the conference will help keep them posted on their customers' problems.

• *Mr. Huber was in Los Angeles last week to cover the ASTE's first Western Industrial Exposition. His next column will present significant impressions picked up behind the scenes at the show.*

NEW!

HOLCROFT'S BANTAM-SIZED BATCH FURNACE

Featuring A 500 LB/HR CAPACITY

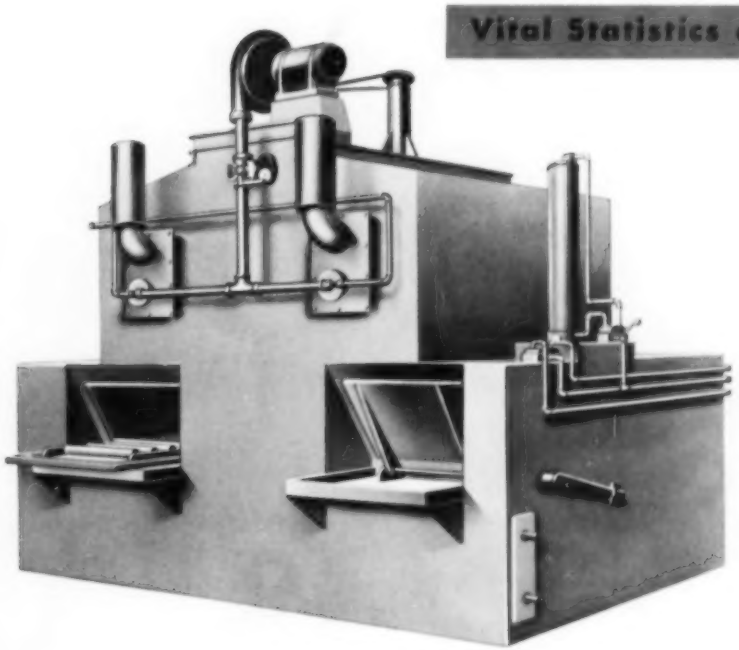
Holcroft's new bantam-sized batch furnace for controlled atmosphere heat treating does a king-sized job at a low, low cost. An entirely new concept of batch operation, the furnace offers new opportunities not only for small plants, but for large ones which have limited or varied production problems. The new batch furnace offers the same engineering know how and quality that has made Holcroft the leader in heat treat development.

It can be adapted to run such typical cycles as: carburizing; carbonitriding; clean, neutral and bright hardening; carbon restoration; normalizing; annealing; tempering and non-ferrous heat treating.

Operation is simple—only two valves are involved. When the stock has completed its time in the furnace chamber it is lowered by an elevator, transferred into position for quenching, and lowered into the quench oil. Simultaneously, a previously-loaded tray of cold work moves onto the charge elevator and then up into the furnace chamber. The operator may remove the quenched stock from the discharge door or load the furnace through the charge door at any time during the heating cycle.

Quenching is fast and there is no loss of heating time loading or unloading. This arrangement reduces atmosphere gas requirements because vestibule flushing takes place while the stock is being heated.

An important feature of the new furnace is its small floor space requirement. No pits are needed; the heat source is above the vestibule—improving working conditions.



Vital Statistics of HOLCROFT'S NEW FURNACE

1. ***Capacity*** — can heat 500 lbs. gross per hour to 1500°F. Flexible enough to be operated at temperatures ranging from 400° to 1800° F.

2. ***Dimensions***—9′ 3″ x 6′ 9″ x 10′ 6″ high.

3. ***Tray size***—two 24″ x 18″ pinned sections with basket on each section for loading 9″ high.

4. ***Operation***—three pneumatic cylinders controlled by two hand-operated valves. Can be made completely automatic.

5. ***Quench tank***—completely enclosed with built-in cooling. Hot oil optional.

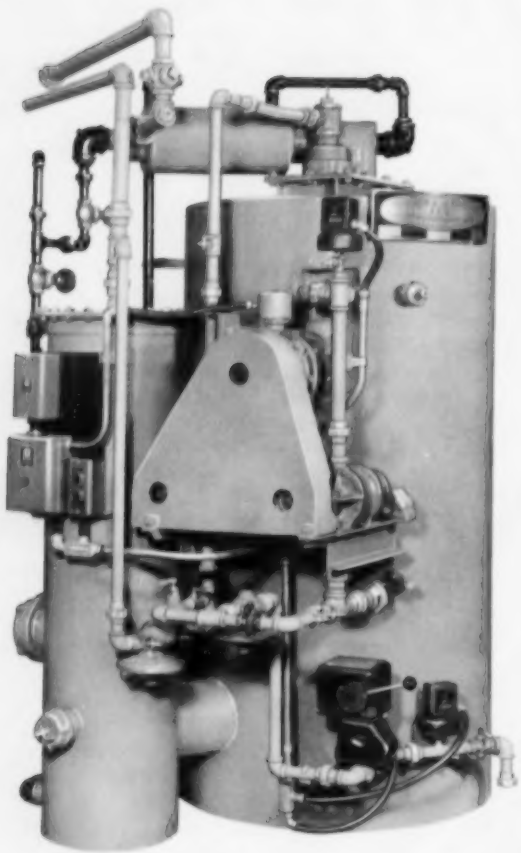
6. ***Fan and Pump*** — same size as on Holcroft's big batch furnace. Variable controlled oil flow.

7. ***Doors***—hinged at the bottom with operating lever at the side of furnace for greater safety.

SEE OTHER SIDE

Another FIRST!

HOLCROFT'S NEW EXO-ENDO GAS GENERATOR



Holcroft has designed a radically-different exo-endothermic gas generator. Designed not only for the batch furnace but for other furnaces as well, the generator can produce gas atmospheres between the limits of perfect combustion and modified "302." At the latter setting, the gas generated has two main differences from a standard AGA Type 302 gas. The first is very much lower dewpoints—as low as minus 50 deg. F. with no detectable amounts of methane. In addition, the gas produced has an approximate 50% lower hydrogen content. This means that for a given carburizing potential, less hydrocarbon addition is necessary. The lower percentage of hydrogen is an added safety feature.

The Holcroft process is covered by U. S. patent No. 2,589,810.

A slight adjustment at the generator can produce a non-explosive atmosphere to perform heat treating cycles below the explosive limits required for atmosphere tempering, annealing, and stress relief of ferrous alloys as well as hardening, annealing and tempering of non-ferrous alloys.

The new generator is an extremely compact unit (but 20 square feet of floor space is required.) The total gas used can be adapted to many manufacturing requirements.

If you have any kind of a heat treat problem—small or large—better call Holcroft.

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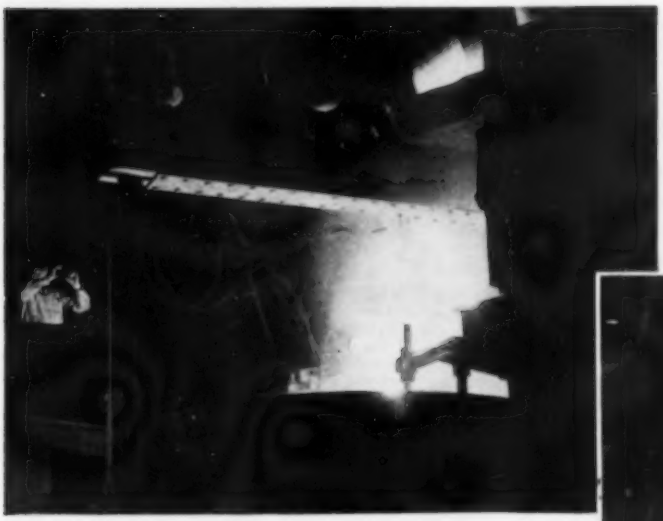
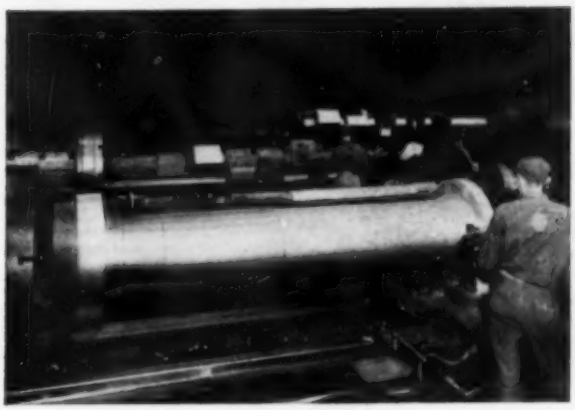
LITHO IN U. S. A. 66.5M DO J-55

HERE'S THE STORY OF YOUR FORGINGS AT NATIONAL FORGE AND ORDNANCE CO.



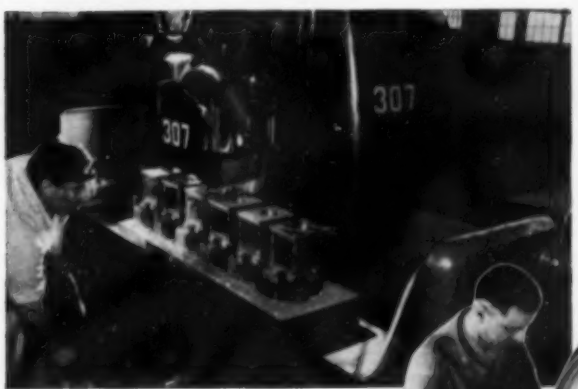
1. Basic Electric Steel is made for all forgings.

2. Forgings are made from Ingots of proper size for the best final result.



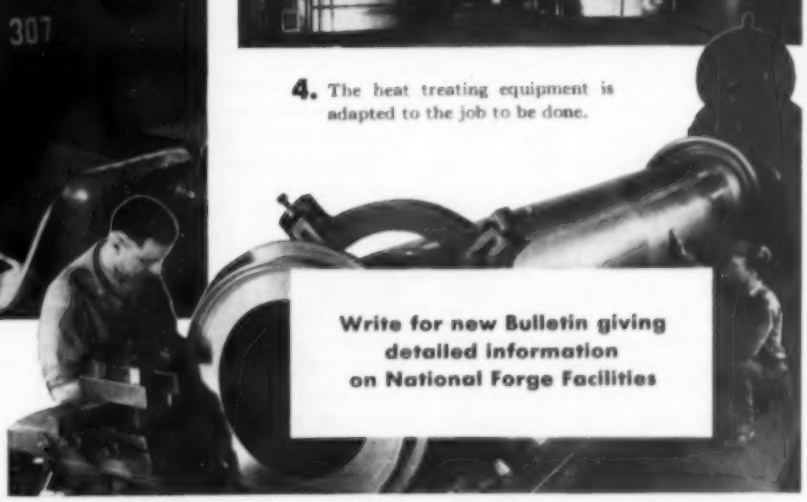
3. Forgings are rough-machined before heat treatment to insure greatest uniformity.

4. The heat treating equipment is adapted to the job to be done.



5. National Forge can make your forgings—large or small—rough or finished.

6. Precision is a by-word at National Forge.



Write for new Bulletin giving detailed information on National Forge Facilities

NATIONAL FORGE AND ORDNANCE CO., IRVINE, WARREN CO., PENNA.

These chips can be hazardous if you don't know . . .

How To Handle Titanium

MANY new problems are posed in the manufacture and fabrication of titanium. Precaution against fire hazards, as American Welding & Mfg. Co. discovered, is one of them.

A few months ago the Warren, O., firm was storing lathe chips and turnings (from hair turnings to sizable chips) in a stockpile outside a building. During a hot, humid afternoon, this titanium scrap burst into flames.

Although the exact origin of the fire is not known, the lathe turnings and scraps were saturated in oil, which may have been a contributing factor. Water, soda and CO_2 failed to put out the blaze. Fortunately, it was an exterior fire and the loss was confined to the value of the scrap.

More Problems—A Midwest steel company was descaling titanium sheets by one of the acceptable methods. A hot stack ignited spontaneously as it was lifted from the bath. The bath, which usually operates at about 800° F, was 50 to 100 degrees higher than the prescribed temperature. Excess heat and the exposed surface of the titanium sheets permitted a chemical reaction to set in, immediately causing fire. This also happened in a sodium hydride bath when the temperatures were above the prescribed maximums.

With their own experience and similar incidents fresh in mind, American Welding made a comprehensive survey of manufacturers of titanium, fabricators and the Bureau of Mines. A summary of their findings on titanium and its hazards follows.

What They Found — As a fine powder, titanium (somewhat like coal dust, flour dust and house dust) is explosive and may ignite spontaneously if dispersed in air. Small particles, such as those obtained in sawing operations, ignite easily and burn with brilliant incandescence. Fine turnings which

result from the fine finishing machine cuts can be ignited with a match. At red heat (1300° F), titanium decomposes steam to free hydrogen. Above 1475° F, it burns readily in atmospheres of pure nitrogen.

Coarser turnings and chips (of the order of 1/32 in. x 3/16-in.), bar stock, forgings and the like are extremely difficult to ignite and present only slight fire hazard.

What Extinguishers?—Ordinary extinguishing agents are ineffective on burning titanium. Water simply accelerates the burning rate and offers the possibility of hydrogen explosions. Water should be applied only to surrounding structures and to the edges of the fire to cool the unignited material below the ignition point. Foam is without value since it is largely water.

Carbon tetrachloride and dry chemical extinguishers seem unsuitable, according to the survey conducted under the direction of Thomas Brown, Amweld director of safety. Carbon dioxide also is unsuitable, since dust clouds of titanium burn readily in atmospheres of pure carbon dioxide.

Some fires probably can be handled like magnesium fires by covering with approved dry compound extinguishing powder or absolutely dry sand.

Argon and Helium—Information indicates that argon or helium gases must displace virtually all the air oxygen to be effective on titanium fires. They can be used, it seems, only in closed containers, as in the reduction chamber of the Kroll process. They are expected to be effective in fires involving titanium chips or dried sludge only if in closed containers, since the methods for applying these gases for fire extinguishing have not been developed.

An atmosphere of argon or helium is normally used over the metal bath and mold. At melting temperatures (about 3250° F) titanium, in contact with air, absorbs oxygen and nitrogen and then becomes brittle and hard to work. The close control needed to produce castings of satisfactory quality tends to minimize the fire hazard.

Check These Titanium Fire Hazards

Machining

Because of conductivity, both work and tool become hot and may ignite oil-type cutting lubricants on heavy cuts. Drilling and tapping may also cause over heating.

Water or water-base coolants should be used for all machining operations. Carbon dioxide can be used, too.

Turnings and metal particles should be removed frequently and placed in covered metal containers. When half full, containers should be removed to an isolated location.

Cutting tools should be designed for titanium and kept sharp to minimize heat generation.

Grinding or Sawing

Dust and particles produced in these operations ignite readily to cause fires or explosions.

Dry grinding particles seem to oxidize and become inert. This work should be done with frequent breaks to allow heat dispersion.

Grinders should be equipped with water exhaust, and the system should not be used for other metals.

In wet grinding, only water or water-base coolants should be used. The sludge should not be permitted to dry before it is removed to an isolated area.

Forging, Rolling and Heat Treating

These operations present only a moderate fire hazard. However, care must be taken to avoid contact with iron oxide at high temperatures.

This is especially true when the metal is at forging (1500 to 1700°F) or annealing temperatures (1200 to 1300°F).

Degreasing

Conventional degreasing methods can be used. Scale is usually removed by sodium hydride in a caustic bath or by sandblasting followed by bright dip in a 2 per cent hydrofluoric, 10 per cent nitric acid solution.

Titanium Powder

This is one of the most hazardous phases. Finely divided powder should always be stored in a cool, ventilated area away from fire hazards, open flame or powerful oxidizing agents.

In shipping titanium powders, wet with no less than 20 per cent water. Pack in metal cans no larger than 10 gal and made of not less than 22-gage metal. Place inside wooden boxes, one to a box. Cans should be securely closed.

Follow ICC packaging specifications 15A and 15B.

Titanium Compounds

Titanium dichloride is highly flammable; it burns rapidly in air and is decomposed by water. It must be kept away from air and moisture, preferably under an inert gas. Titanium tetrachloride is corrosive, forming a strong acid in water. It should be stored in closed containers in a cool, well-ventilated area. Titanium trichloride is also a highly corrosive liquid with characteristics similar to titanium tetrachloride.

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Broaching Goes Automatic

Equipping a standard machine with loader makes it a high-output, automated unit

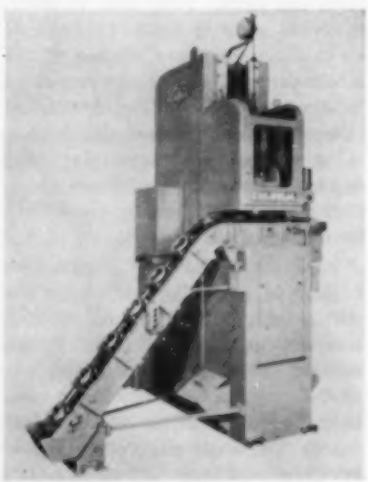
BECAUSE broaching is one of the faster ways to machine metal, adapting it to automation techniques produces a natural and practical combination.

An example of such a combination is an automated development by the Colonial Broach Co., Detroit. This unit (a 15-ton pull-up machine with a 48-in. stroke) broaches the inner diameters of automobile differential ring gears at the rate of 300 an hour.

Automating this machine for its high output entailed equipping it with an automatic, chain-type loading fixture that permits loading of gear blanks from floor level. Twenty-two locating fixtures and 22 broach-return gaps are spaced alternately along the double chain loading conveyor.

Operation—The conveyor is driven hydraulically and indexed every half machine cycle, once for the cutting stroke and once for the broach return stroke. Broached blanks are gravity unloaded as the conveyor sweeps around the sprockets at the loading station.

All hydraulic and electrical circuits are interlocked for timing and safety. One example is the precaution taken to insure the broach during each cycle. Should a failure occur, a limit switch mounted on the puller automatically shuts down the entire machine.



Standard Colonial pull-up broaching machine with automatic loader

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Jalloy Plates outlast other steels by margins of 4 to 1

Jalloy Aprons in Tyrock screen last 3 times as long as other steels

Jalloy lowers maintenance costs on ore and coal conveyors

Jalloy provides longer wear with less repair in truck bodies

Jalloy Heat-Treated Plate is the special purpose steel that is heat treated to provide longer wear on applications where impact and abrasive conditions are severe.

In comparison with other abrasion-resistant steels as well as mild steels, it gives optimum results when heat treated, to a Brinell hardness of 340 and up. Jalloy permits savings in steel costs, maintenance, and repair. Furthermore, it is easily welded.

Jalloy is available in three grades—1, 2, and 3 to meet various service requirements.

J&L STEEL

Jones & Laughlin

STEEL CORPORATION — *Pittsburgh*

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

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3 Gateway Center, Dept. 404, Pittsburgh 30, Pa.

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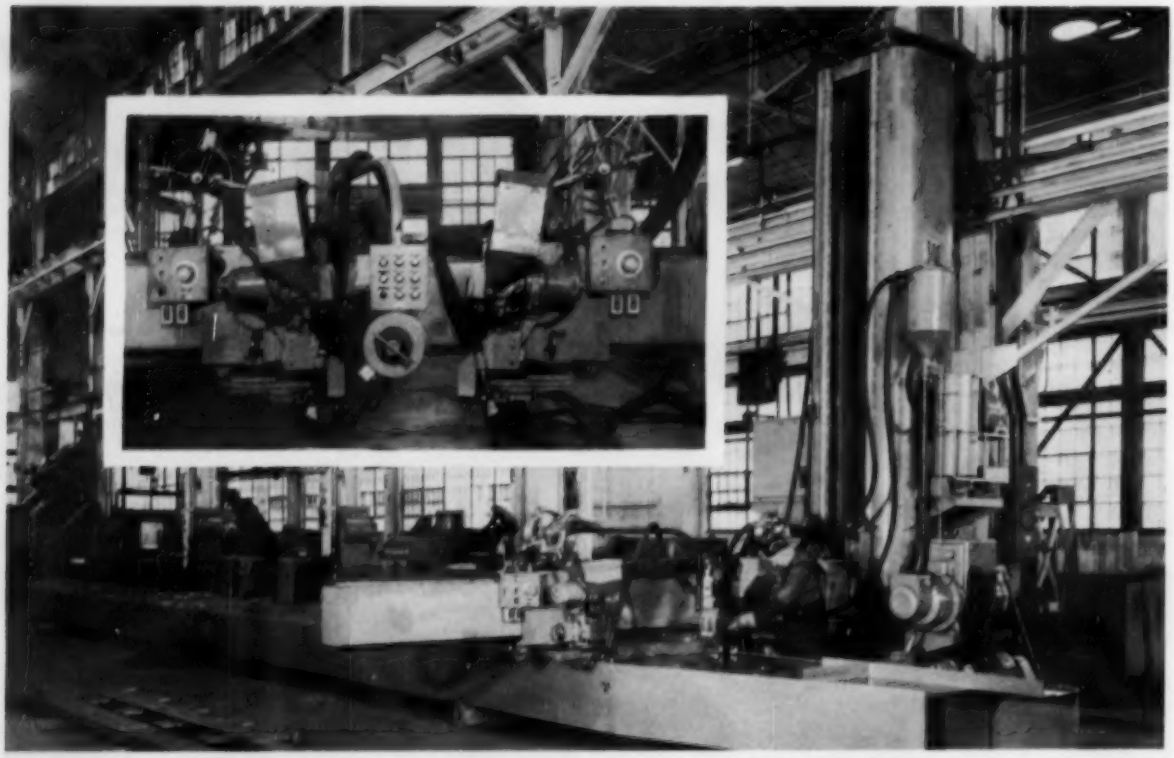

Traveling on its own 110-ft-long track, this giant can weld at speeds up to 120 ipm. Morgan has reduced welding time on girder seams by as much as 94 per cent (inset). Front view of the continuous welder shows the central control station and the two floating heads. Note the tracking wheels that guide the submerged-arc heads

Express Welder Is Fabricator's Dream

There's only one in existence, but when other fabricators get a look at this versatile machine, it won't be alone for long. It removes the human variable in welding

IT USED TO TAKE four men about 96 hours to weld 75-ft crane girders; now two men are doing the same job in 4 hours. They've got a unique welding machine helping them.

With it, Morgan Engineering Co., Alliance, O., is eliminating the variables of manual welding operations and increasing weld penetration. Big as this continuous welder is, Morgan figures on having it payed for with the savings from 60 large girder weldments.

Teamwork—The machine was designed and developed by Morton Mfg., Muskegon, Mich., with both financial and technical assistance from Morgan. Riding on its 110-ft track, the welder can attain speeds up to 120 ipm. The unit has two submerged arc heads that float both vertically and along the ram horizontally.

A special tracking device on each head permits it to trace curves and follow a change in direction along a girder flange, up to a maximum of a 45-degree turn. Once operators start the welds, their only chore is to chip off the flux crust and occasionally check fillet contour. A Hobart constant-voltage machine automatically maintains arc.

Versatility, Too—Besides using it for their long girder welds, Morgan plans to weld both girth seams of hoisting drums at one time. By swinging the machine arm over a rotating weld positioner the two heads can be operated simultaneously on this or a number of different weldments.

Installation of the machine brings Morgan close to completion of a five-year program of modernization and improvement of its crane and heavy equipment manufacturing facilities. As little as two years ago, only 20 per cent of the fabrication was welded. Now some 80 per cent is in weldments.

Facilities include the latest in shape-cut burning equipment, automatic welders and positioners. To handle its extensive production of gearing, Morgan will soon be operating a new Denver flame-hardening machine. This giant will have extremely accurate temperature control for hardening to any desired specification.

CRUCIBLE TEMPERED
SPRING STEELS

Crucible hardened and tempered spring steels give you the best combination of maximum toughness, resilience and resistance to fatigue.

You get exceptional *uniformity*, too. For once a standard for *your* application has been set, hardness tests, and bend tests for toughness, insure *exact duplication of production lots.*

Crucible hardened and tempered spring steels are promptly available in a full range of sizes, tempers and finishes – in coils or cut to your particular length requirements. And experienced Crucible metallurgists can help you make the best choice for your job. For information on cold-rolled tempered and specialty steels, get your free copy of Crucible's 32-page booklet. For your copy, mail the coupon to: *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

S-321

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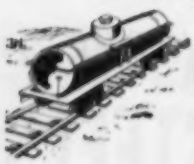
ARCOS FOR FINEST QUALITY WELDS



*Putting profitable benefits into welded **aluminum** tank cars*

Besides permitting bigger pay loads with less "dead" weight, aluminum performs a dual role on this *welded* tank car. Inside, it provides even distribution of heat from heater coils to keep viscous fluids free-flowing for fast unloading. Outside it eliminates maintenance—never rusts, never needs painting.

An important key to success on *any* aluminum welding job is the quality of weld metal. Newly-developed ARCOS ALUMINUM RODS and ELECTRODES assure you a dependable answer to this requirement. They give you the properties you need to make the most from aluminum's durability, strength, appearance and maintenance-free qualities. Specify Arcos for profitable aluminum welding. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pa.

WELD WITH ARCOS

ALUMINUM RODS AND ELECTRODES

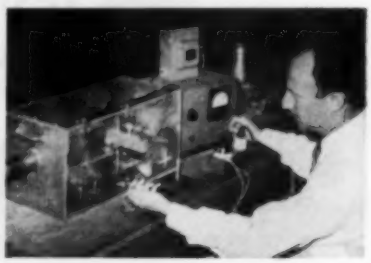
Abrading for Progress

Abrasion-resistance measuring device developed to test finishes on naval aircraft

ABRASION RESISTANCE of organic coatings on metals is an important factor in service performance. A new method uses a high-speed jet of fine abrasive particles directed against the coating to measure this quality.

Because this instrument readily simulates a variety of service conditions, it can be used to determine abrasion resistance on all types of protective coatings, regardless of gloss, color, thickness or surface area. It was developed by the National Bureau of Standards under sponsorship of the Navy Bureau of Aeronautics.

Operation—In the abrasive jet method, carbon dioxide gas under controlled pressure propels an abrasive powder from a vibrating storage chamber through a nozzle onto the test specimen. The mounting arrangement of the test specimen and nozzle assembly permits rotational, back-and-forth or up-and-down adjustment.



ABRASIVE JET EQUIPMENT
. . . measures abrasion resistance of metal coatings

The angle between the nozzle tip and surface to be abraded is adjusted by a graduated rotating disk attached to the nozzle shaft. A calibrated taper gage permits rapid and accurate adjustment of the nozzle-to-specimen distance at abrading angles from 20 to 90 degrees.

In studies at NBS, the abrasive jet method has been found to distinguish significantly between materials difficult to differentiate by qualitative means. Although the degree of correlation with actual service performance has not been definitely established, work to this end is in progress.

Production speeds of 300 fpm are attained on this . . .

Tube Straightener

ACCURATE end-to-end straightness is required for hot-rolled seamless tubing used in tapered roller bearings and in the manufacture of transmission parts.

Timken Roller Bearing Co. achieves this at its Wooster, O., plant with a Sutton, Model 2, MKTC, seven-roll machine at production speeds up to 300 fpm.

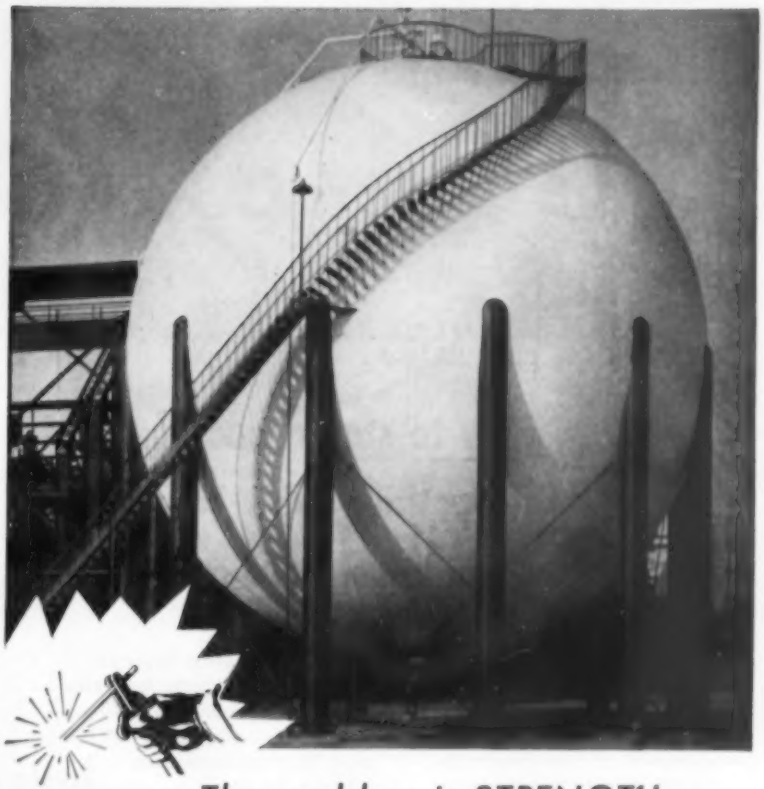
How It Works—Three-roll clusters, consisting of a driven roll and two opposed idler rolls, are positioned at the entry and delivery ends of the straightener. Between the clusters, at the center of the pass line, is an unopposed pressure roll.

This arrangement provides even pressure around the tube and confines the work to the pass line without use of guides.

Tube sizes at Timken range from 1¾ to 3 9/16-in. OD.

Close-up shows the position of entry rolls in cluster-roll arrangement

ARCOS FOR FINEST QUALITY WELDS



*The problem is STRENGTH... and the WELDS **must not** fail*

A Hortonsphere® is the practical answer to the problems presented by the tensile stress inherent in the storage of gases under high pressure. Its spherical shape assures uniformity of stress—but because all stresses are in tension—the tensile strength of the weld must match that of the high-tensile, low-alloy-steel base metal.

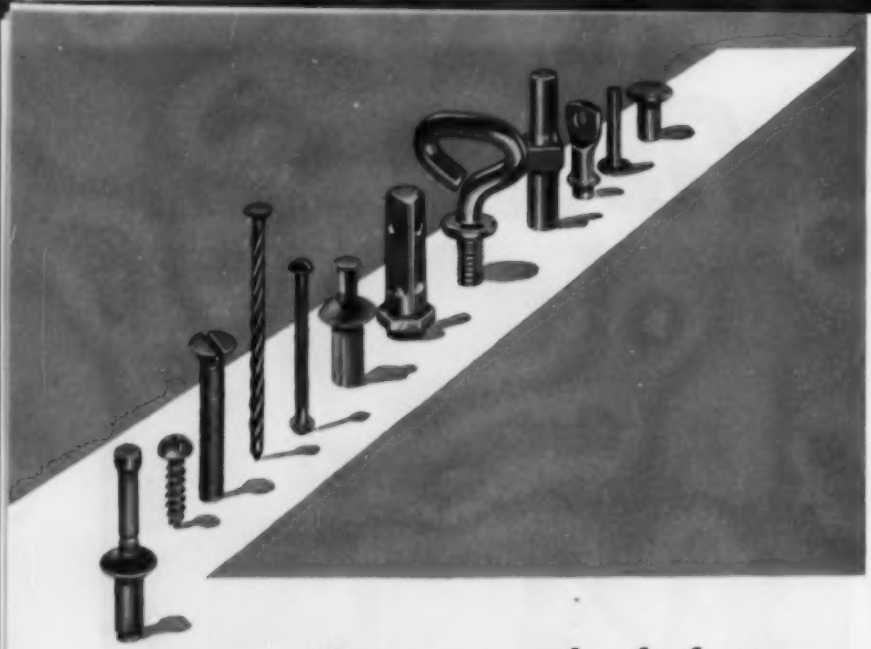
All-welded field fabrication is easy and economical on applications like these with ARCOS Low Hydrogen Electrodes. Welds are uniform whether performed down-hand, vertical or overhead. Economy is assured because *one* electrode that is "just right" for the job can be used for all-position welding. What's more, no preheat is needed to prevent underbead cracking.

When you have a field welding application, or a shop welding problem on high-tensile steels, weld with ARCOS Low Hydrogen Electrodes for assured weld quality . . . time and money savings on the job.

®t. m. reg. Chicago Bridge & Iron Co.

WELD WITH ARCOS

LOW HYDROGEN ELECTRODES



How to stay ahead of your competition with Townsend special fasteners and parts

In today's highly competitive markets many design engineers and production managers find they improve products, reduce material costs and assembly time with Townsend's method of cold-forming fasteners and small parts. It enables them to put greater value into their products and at the same time hold unit costs down.

The Townsend method often replaces costly, material-wasting methods with savings that range from $.70 to $80.00 per thousand. Annual savings are often substantial—$15,816 on an automobile door lock part—$12,000 on a washing machine fastener—$11,190 on two parts for home laundry equipment—$15,630 on two refrigerator fasteners—$5,130 on an electrical connection.

Townsend engineers specialize in the assembly and fastening of all types of materials for all industry. They draw upon more than 10,000 standard and special items developed in 138 years of cold-forming experience and rely upon Townsend's capacity to produce 60-million pieces daily to give you the best in fastening methods. To learn how to improve fastening efficiency, ask to have an engineer call.

Townsend

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NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division: Santa Ana, California

THE FASTENING AUTHORITY—Experience: *over 138 years*—**Capacity:** *sixty-million parts daily*—**Products:** *over ten-thousand types of solid rivets–cold-headed parts–Cherry Blind Rivets–Twinfast Screws–self-tapping screws–tubular rivets–locknuts–special nails–formed wire parts.*

Plants: *New Brighton, Pa.—Chicago, Ill.—Plymouth, Mich.—Santa Ana, Calif.*

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

Brazing Sintered Metals

Porous powdered metal parts absorb brazing alloys. Here's how to overcome that problem

MANY metal fabricators realize substantial savings by using sintered metal parts joined by brazing instead of machined parts.

However, because of its occasional high porosity, sintered metal can be tricky to braze. When the sinters are made dense, they can be brazed normally. But when the parts are porous—typically in bearing applications—the porosity may interfere with the making of a good joint. Porous compacts tend to absorb the brazing alloy, much like a sponge soaks up water, leaving little or no alloy for the joint.

A Solution—Laboratory technicians at Handy & Harman, New York, have come up with an answer. They fill the pores just below the surface of the metal with colloidal graphite. The graphite forms a nonwettable, nonabsorbent coating which prevents the alloy from soaking into the interior of the piece. Graphite emulsions, in

GRAPHITE COATING

. . . prevents brazing alloy absorption

oil or water base, are available for this purpose. In some cases, the oil base may be preferred because it usually penetrates the metal more readily.

After the coating is dry it is removed from the joint surface which then is degreased with a solvent. The piece is ready to flux and silver braze.

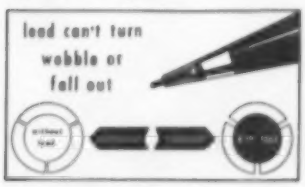
A number of firms have solved a difficult brazing problem with this process. Some high-production shops use the batch system for applying the graphite, drying and degreasing which reduces handling time to about a minute a piece.

Autopoint

Gets the Lead Out

with CONTINENTAL fine wire mechanical pencil lead plungers

Autopoint's patented "Grip-Tite" tip through which the Continental wire plunger expels the lead for perfect writing.



Autopoint is just one of many fine-wire users who have found that Continental fine-wire performs to the exact specifications for which it is designed. It takes real application engineering to enable Continental to stand behind the promise that the wire must be right for a particular product—for it's *made* right. More than a half century of wire making means that Continental can bring valuable case histories and invaluable research and testing to bear on your wire problems. Call or write us at Kokomo for the help you need.

Some of the Many Uses made of CONTINENTAL WIRE

Continental Coil Binding Wire... Braces for Automobile Fenders... Steering Wheel Inserts ...Wheel Spokes for Toys and Wagons... Yoke Wrapping for TV Picture Tubes... Heavy Wire for Hose Reels... Trash Burners... Wire for Stapling... Paper Clips ...Metal Fasteners... Florist Wire

CONTINENTAL STEEL CORP. STEEL CONTINENTAL WIRE KOKOMO, IND.

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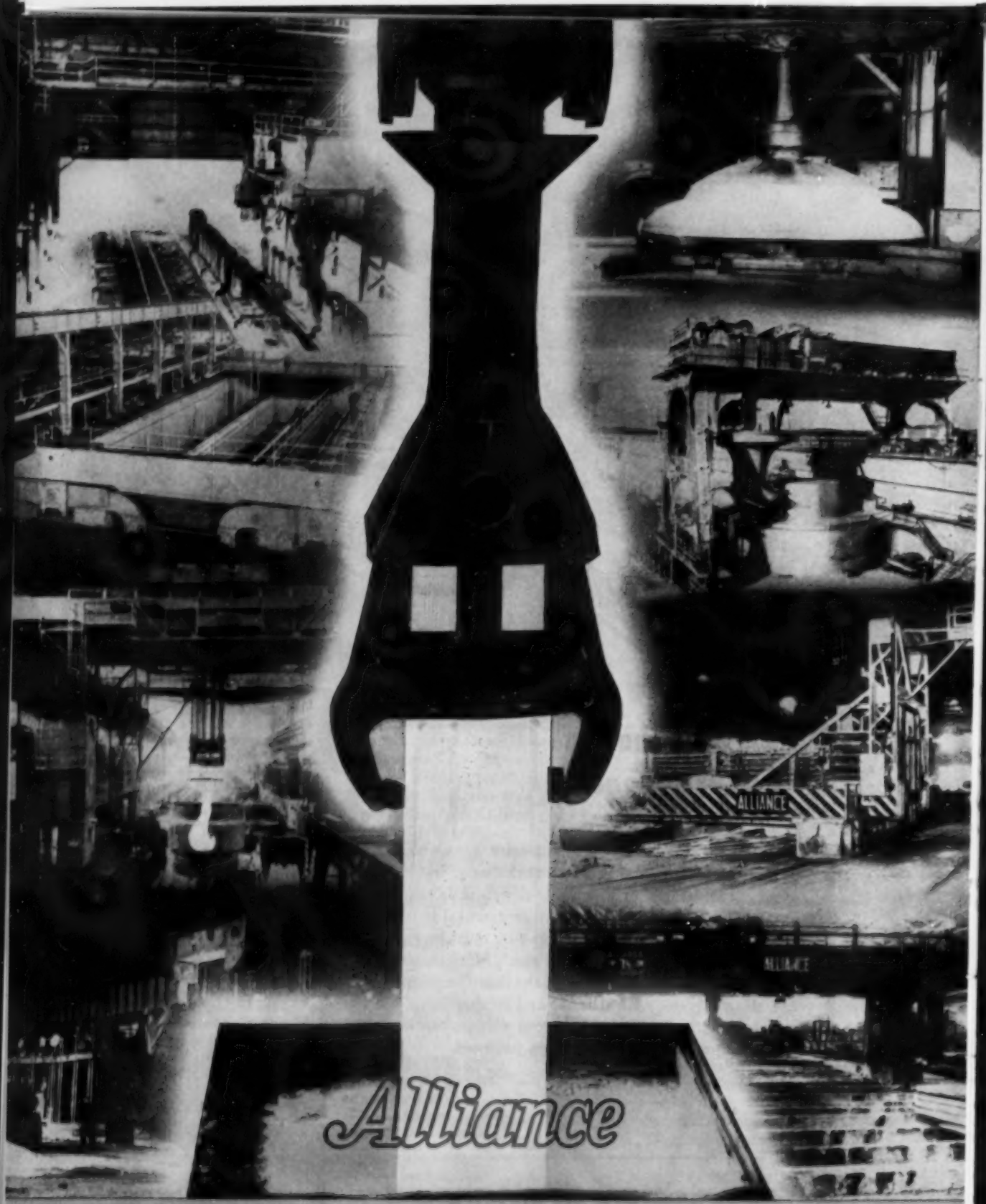

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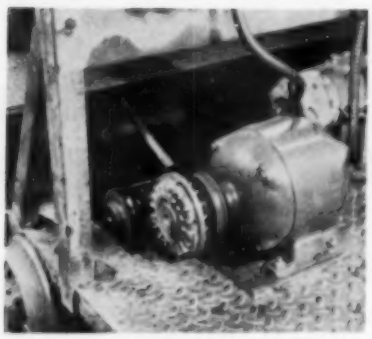
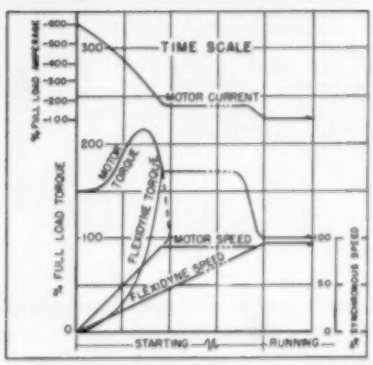
Dry Fluid Drive: Protection Against Shock and Overload





Typical speed-torque curve of standard squirrel-cage motor connected by Flexidyne to load with hard-starting characteristics

Flexidyne is a new development in industrial power transmission. Based on a new principle, it easily handles difficult starting and reversing problems and gives a new kind of protection against shock and overload. It does not slip at normal operating speeds. With overload, slippage gives protection.

It is claimed to have wide application for industrial drives involving heavy inertia and shock loads on such equipment as compressors, centrifuges, conveyors, crushers and machines used in metalworking plants. The drive is made up of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot (the flow charge) which acts like a fluid. It is the flow charge which transmits power from the housing to the rotor.

Here is how it works: The motor is connected to the housing, and starts it turning at no load; the flow charge is thrown to the circumference of the housing, is compressed by centrifugal force and revolves with the housing; the rotor, connected to the load, is started and accelerated by the friction and wedging action of the revolving flow charge.

Rotor and housing reach identical speeds. In case of an overload, before damage is caused, the rotor slips relative to the housing, overcoming the friction and wedging action of the flow charge. A thermal switch, which automatically cuts the electrical circuit if an overload persists, is available as optional equipment. Accurate overload protection is assured. The drive can be set to slip at anywhere from as low as 20 per cent torque to as high as peak motor torque. During starting and overload periods, the current draw is at a minimum. With the standard drive setting, the motor is never pulled down to less than 90 per cent of synchronous speed.

Constant torque is produced for a given input speed, regardless of the percentage of slip between the rotor and the housing (which only occurs during starting or overload). Dodge Mfg. Corp., Mishawaka, Ind. Mishawaka 9-2421

Face Grinding Machine

The work spindle is in a horizontal plane, permitting wide flexibility of work-holding devices. The work rotating in a vertical plane affords easy cleaning of the work-holding surface, effective coolant application and extremely high surface quality of the work being ground. Grinding with the periphery of the wheel, this machine produces accurate, flat surfaces on work up to 10 in. in diameter and up to 3 in. thick. The permanent magnet chuck with face chuck attachment is 4¾-in. thick.

Wheel slide grinding and truing speeds are readily selected and set. A graduated dial indicates rate in use. Automatic workfeed can be set for the inside and outside reversal or inside reversal only. The dwells (from 0 to 2½-seconds) are independently variable at the inside or outside or both. A positive stop for both manual and power feed of the work head is valuable for accurate sizing. Controls are automatic or semiautomatic. Brown & Sharpe Mfg. Co., Providence 1, R. I. Dexter 1-5000

CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

the average plant will spend

This expenditure is not just a guess! It's an actual fact! It is based upon an authoritative industry-wide survey made by the Editors of AUTOMATION Magazine.

This survey shows for the first time the extent of industry's *immediate* plans for making operations *more automatic*. It dispels any idea that this market is only for the *future*.

From the actual figures given by 921 plants the study indicates that plants of all sizes are shopping this year for *over five billion dollars worth* of equipment and components to help make operations *more automatic*.

If you've got something that contributes toward making *any* operation more automatic, you've got yourself a tremendous market . . . and you've got it RIGHT NOW.

If you want to talk to this market quickly and effectively, there is only one publication that provides a direct line of

right now... in 1955!

$378,000 for automatic equipment!

this hefty amount represents the average expenditure...

by all sizes of plants

in all types of industry

for all types of automatic equipment

fast communication. That publication is AUTOMATION . . . the magazine of automatic operations. Here is your quickest way to reach, *and sell*, this current five-billion dollar market. Here's a tremendous opportunity that justifies a real *impact* schedule in AUTOMATION in 1955.

This newly compiled "Analysis of Industry's Spending Plans for More Automatic Operation" presents a breakdown of general equipment planned, and specific types to be used, in small, medium and large-production plants. Your AUTOMATION representative will be glad to show you this analysis, or send us your request direct.

AUTOMATION

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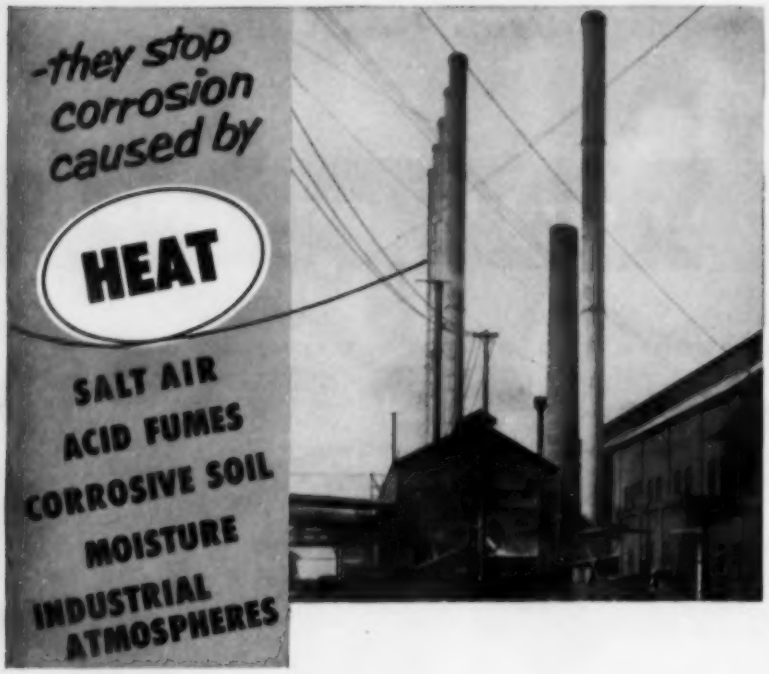

TOUGH CORROSION PROBLEMS can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes *specialized* protective coatings . . . the Bitumastic Coatings Koppers makes.

Take these stacks, for example. Heat caused ordinary coatings to "give up" in two weeks to a month. Then, one thin coat of Bitumastic® Hi-Heat Gray was applied. After four years' service, this specialized coating was *still* in good condition.

Hi-Heat Gray resists intermittent temperatures as high as 1200° F. It contains metallic zinc powder which, at high temperatures, tends to fuse to the underlying steel, providing a protection similar to metallic zinc.

No one coating can stop all kinds of corrosion. Therefore, Koppers makes an entire family of Bitumastic Protective Coatings. Send for free booklets describing them. At the same time, tell us about *your* corrosion problem so that we can recommend a method for its satisfactory solution. There is no obligation, of course.

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BITUMASTIC PROTECTIVE COATINGS
SOLD THROUGH INDUSTRIAL DISTRIBUTORS
KOPPERS ®

NEW PRODUCTS and equipment

Motor-Operated Tap Switch

This single knob tap switch is for use with regulated rectifiers. It can be integrally mounted on any Udylite 1500 to 6000-amp rectifier with a remote raise-and-lower pushbutton on the meter panel. This means that the rectifier with built-in regulator can be away from the tank yet completely controlled from the Udylite standard

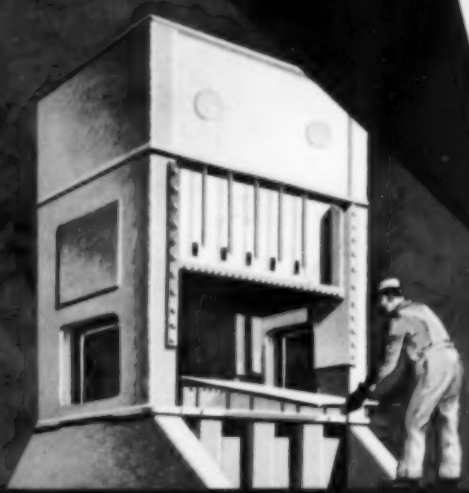
meter panel at the operator's position. This saves floor space. Regulation is the same as the manual switch, with 22 positions from minimum to maximum.

If desired, automatic voltage, current or current density control can also be furnished. Delivery from Detroit is six weeks. Udylite Corp., 1651 E. Grand Blvd., Detroit 11, Mich. Walnut 1-3500

Heat Treating Furnace

This bantam-sized batch furnace is designed for controlled atmosphere heat treating parts at plants having limited or varied production problems. Typical work includes carburizing, carbon - nitriding, cleaning, neutral bright hardening, normalizing, annealing, tempering and nonferrous heat treating. The furnace can be operated at temperatures ranging from 400 to 1800° F and has the capacity to heat 500 lb (gross) per hour to 1500° F.

Only two valves are used in the



Two Steels Are Fused By Jessop Skill To Bring You Better Dies At Lower Cost

One milestone in Jessop's drive for absolute supremacy in the realm of fine specialty steels is its unique ability to fuse together tool steel and tough, non-hardening carbon steel and then roll them into one solid inseparable die section. The advantages to this exclusive process are great. Forms resist shock better, and can be more readily shaped. Dowel and screw holes may be drilled after hardening, and cost per pound to you is up to 40% less than solid tool steel die sections. Whether or not you buy die sections, this Jessop "first" should interest you. A company that has the spirit and progressiveness to constantly search for new ways to serve its customers better is a good one to do business with. Send us an order for one of the specialty steels shown below.

STAINLESS STEELS • HIGH SPEED STEELS • NON-MAGNETIC STEELS • HIGH SPEED TOOL BITS • HEAT RESISTING STEELS • STAINLESS-CLAD PLATES • CARBON AND ALLOY STEELS TOOL STEELS FOR SPECIAL PURPOSES • CAST-TO-SHAPE TOOL STEELS • HIGH SPEED AND ALLOY SAW STEELS • TEMPERED AND GROUND STRIP STEEL • COMPOSITE HIGH SPEED STEELS • STAINLESS AND HEAT RESISTING CASTINGS • COMPOSITE DIE STEEL SECTIONS PRECISION GROUND FLAT STOCK • DIE STEELS—HOT AND COLD WORK

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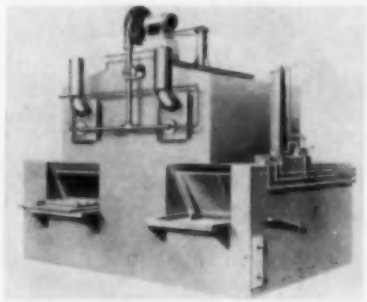
INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

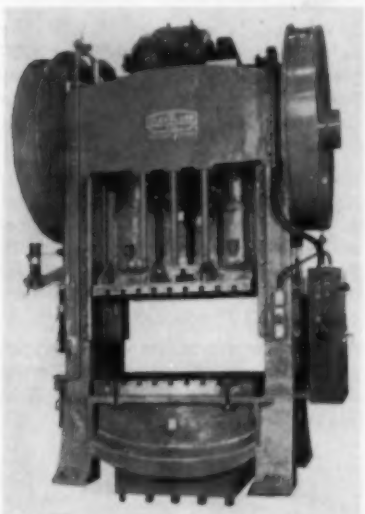
operation. The furnace requires less than 63 sq ft of floor space.



No pits are needed. Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich. Tyler 4-5700

Double Crank Press with 200-Ton Capacity

The bed and slide area is 48 x 60 in. The stroke is 12 in. This double-geared, twin-drive press (illustrated) is equipped with a single - station, electrically controlled, air-operated, drum-type friction clutch. The slide and bolster are T-slotted. The slide, which has power adjustment, is air counterbalanced. The press



is arranged with a centralized, mechanically operated lubrication system. The pneumatic cushion in the bed has a 6 in. travel and a capacity of 40 tons at 100 lb air pressure.

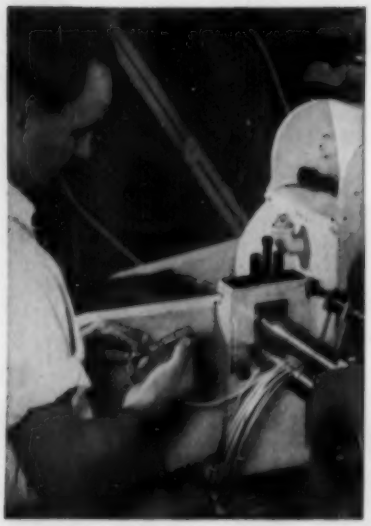
An inclinable press (11 I) has a

SUPERIOR QUALITIES
...because they're Shenango centrifugal castings. Typical, these flanged mill stand bearings of bronze have greater strength, closer-knit grain, better machining characteristics than ordinary castings. Won't such qualities pay off in the symmetrical parts you need? For helpful Shenango bulletin on centrifugally cast ferrous or non-ferrous parts, rough or finished, write to: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio (Executive Offices: Pittsburgh, Pa).
SHENANGO
CENTRIFUGAL CASTINGS
COPPER, TIN, LEAD, ZINC BRONZES · MONEL METAL
ALUMINUM AND MANGANESE BRONZES · NI-RESIST · MEEHANITE METAL

MONEL • NICKEL • COPPER • ALLOYS

THIN STRIP

for exacting standards only



Not one strip rolling requirement in ten need be carefully "miked" to assure close width tolerance.

But that exceptional job is routine with Somers THIN STRIP. Monel, pure Nickel and Nickel alloys are rolled to within ±5% from .010" to .00075", with the same degree of accuracy in widths, and with the exact properties required by your product.

Modern rolling, annealing and precision control equipment assure uniform high quality under the most rigid specifications.

And Somers 40 years experience in a wide range of applications is available to help solve your strip problem without obligation.

Write for confidential data blank or field engineer.

FOR EXACTING STANDARDS ONLY

Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

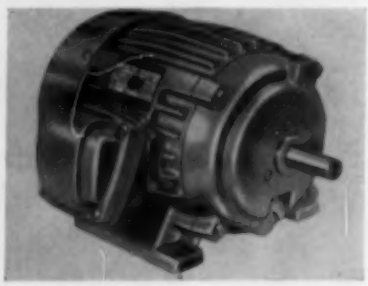
NEW PRODUCTS and equipment

110-ton capacity. It is single geared and equipped with electrically controlled, air-operated drum-type friction clutch, with spring-loaded brake. The flanged slide is air counterbalanced and is arranged with power adjustment. The flywheel is equipped with an air brake to bring it to a quick stop when the power is shut off. Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., Cleveland 14, O. Henderson 1-1911

Explosion-Proof Motor

The type E is presently made in ratings from 1 to 5 hp. Designed to operate in dangerous locales, it is made for Class I, Group D services (highly inflammable gases and volatile liquids) and Class II, Groups F and G (combustible dusts). The motor is fully enclosed.

The conduit box, of extra-heavy



design with a split dome, is securely sealed. The internal bearing caps are extended along the shaft to protect against sparks traveling to the exterior. Rabbeted register fits effect a complete seal of the bracket to the motor frame. The frame is solid, one-piece cast iron with external ribs for reinforcement and rapid heat dissipation. U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, Calif. Adams 3-3131

Die Casting Machine with Prefill Injection System

The HP-3X-SF will cast up to 16 lb of aluminum or proportionate weights of magnesium or brass. It is also convertible to zinc die casting. In the shop assembly, the machine exerts up to 33,200 psi of

Somers

UNIGRAIN®

thin strip brass for deep drawing

Uniform fine grain size of Somers eyelet brass—less than .010 mm. (75X).

with

Fine Grain Finish

Somers Brass Company is pleased to announce the availability of a new, unique annealing process which makes possible a uniform fine grain of less than .010 mm. which can be drawn to full 40% elongation.

Developed in cooperation with the Selas Corp. of America this new process makes it possible to deep draw Somers THIN STRIP and still obtain a fine grain which is easily buffed to a brilliant finish.

And this new Selas Furnace provides high production as well as close control of temper and uniformity. It is typical of the modern equipment with which Somers produces copper, brass and other alloys to rigid specifications between .010" and .00075".

If you have a problem with thin strip, let Somers experience help you. Write for confidential data blank or field engineer.

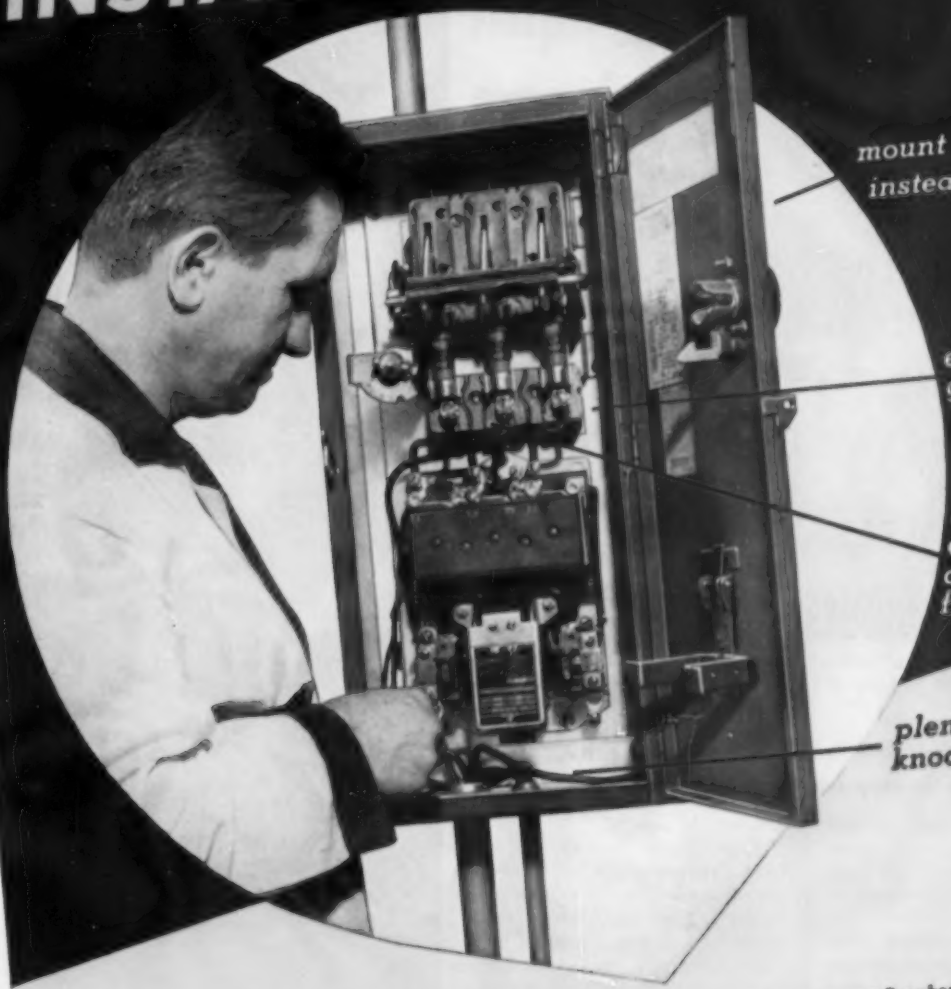
FOR EXACTING STANDARDS ONLY

MONEL • NICKEL • COPPER • ALLOYS

THIN STRIP

Somers Brass Company, Inc.
WATERBURY, CONN.

EASIER TO INSTALL AND MAINTAIN!



mount 1 device instead of 2

extra-wide gutters

all components accessible from front

plenty of knockouts

SQUARE D COMBINATION STARTERS

(Switch or Circuit Breaker Types)

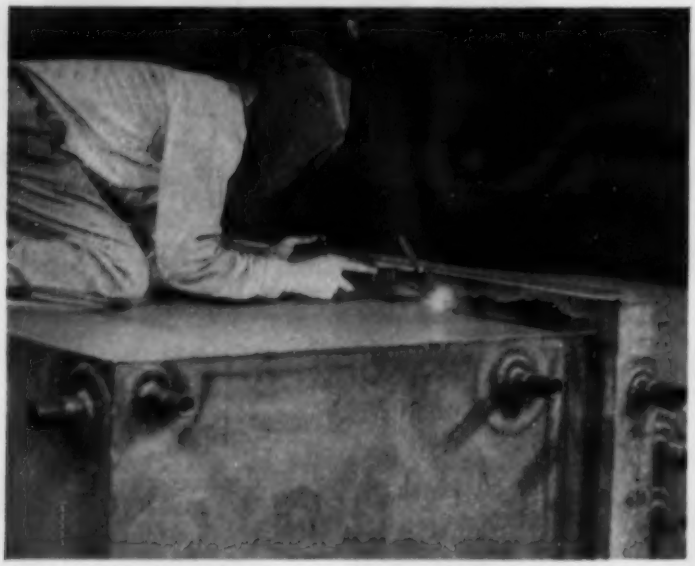
Save space and time. Mount and wire one device instead of two . . . neater, more attractive installations.

Write for Bulletins 8538 and 8539
Square D Company, 4041 N. Richards Street, Milwaukee 12, Wisconsin

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

CORROSION-RESISTANT EVERDUR QUADRUPLES LIFE OF DEGREASING TANK



WELDING CHANNELS on side of tank with EVERDUR-1010 Welding Rods. Fabricated in 3 sections, this tank was welded and assembled by Storts Welding Company, Meriden, Conn.

DEGREASING TANK 30′ long, 6′ high and 2½′ wide and made of ¼″ EVERDUR-1010 Sheet.

Easy to work and weld, Everdur also proves adaptable to money-saving fabricating methods

Trichlorethylene—the solvent used in this degreasing tank—may break down to form hydrochloric acid when heated in the presence of moisture.

So serious is the corrosion problem that tanks made of ferrous materials, for example, have lasted no more than two or three years in this service.

The manufacturer's problem? To find a material that would not only resist this acid corrosion but also lend itself to low-cost fabricating methods.

After consulting with Anaconda's Technical Department, the manufacturer decided to fabricate the tank of EVERDUR® — ANACONDA's Copper-Silicon Alloy. Fabricating costs were low and tank life is estimated to be over twelve years.

Corrosion-resistant. EVERDUR resists corrosive attack by hydrochloric acid. It can't rust. And it is unusually strong, tough and fatigue-resistant. What's more, EVERDUR is . . .

Easy to work. You can work and form EVERDUR plate hot or cold. EVERDUR alloys are also available for forging and machining. Weldability? You'll find EVERDUR . . .

Easy to weld, too. The inert-gas shielded-arc methods produce high-quality welds at good speeds and moderate cost, and with minimum distortion. This tank was welded with the argon-shielded tungsten arc, using ⅛″ and 5/32″ diameter Everdur-1010 Welding Rods.

EVERDUR Copper-Silicon Alloys are available in plates, sheets, rods, wires, tubes, electrical conduit and casting ingots. Your own equipment or corrosion problem will be given careful attention by our Technical Department. Write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

®Reg. U. S. Pat. Off. 54127

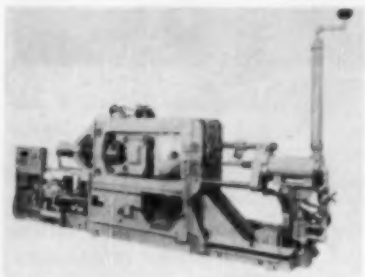
EVERDUR

ANACONDA®

COPPER-SILICON ALLOYS

Strong • Weldable • Workable • Corrosion-Resistant

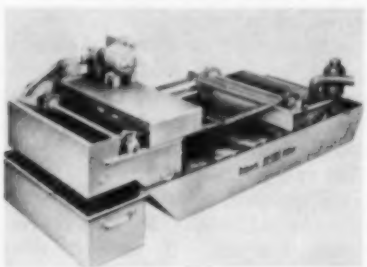
pressure on metal. Both shot speed and pressure are adjustable. An ASME-approved nitrogen accumulator provides high-speed injection. A special feature of the machine is the angled support bars of the injection system, which simplify metal pouring.



Six hundred tons of preload clamping is possible with the one-piece alloy steel frame. The pumping system uses a 25-hp motor and includes a 2000-lb booster pump. Lester-Phoenix Inc., Dept. N-2, 2711 Church Ave., Cleveland 13, O. Cherry 1-1046

Filter Uses Permanent Media

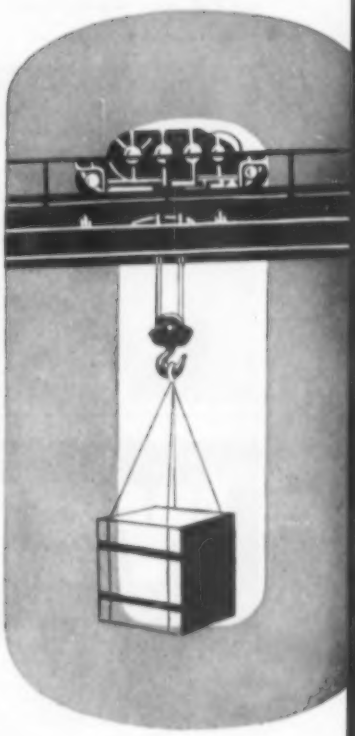
The Delpark Up-Flo filter utilizes gravity to remove heavier solids before filtration of the liquid through a horizontal bar-type screen. Only the fine particles held in the suspension reach the screen. Chain-driven flights operating on a time lapse sequence pass under

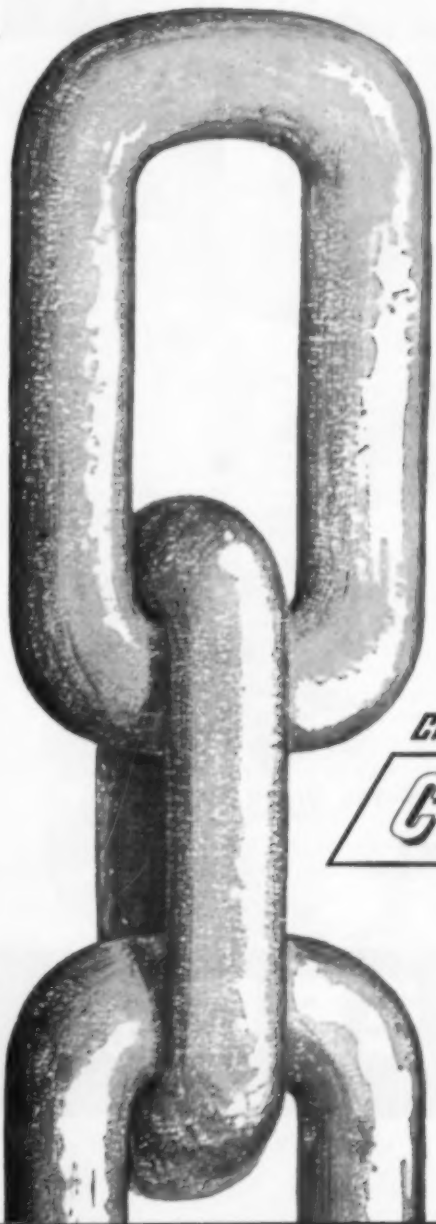


the filter and remove deposits from the underside of the screen and the area beneath. A device cleans the flights. Filtered swarf drops into a tote box for disposal.

All sizes, flows and capacities are available. Industrial Filtration Co., Dept. U-297, Lebanon, Ind. Lebanon 1877

important ⇨ LINK in AUTOMATION





A step toward automation is equipment for faster, less costly handling of heavy materials; cranes, custom designed for specific applications. Conco engineers can design such cranes — the right lift, the right speed, the right clearances. Thirty seven years experience are behind every Conco Crane recommendation. Request a Conco representative to call and discuss your problem. Or, write for Bulletin 3000A covering the complete Conco Crane line.

CRANES HOISTS

CONCO

CONCO ENGINEERING WORKS

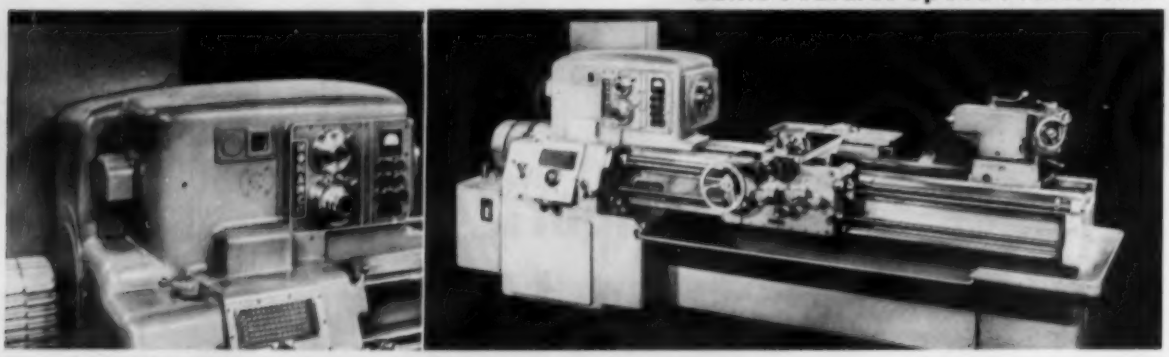
Division of H. D. Conkey & Company

70—14th Avenue, Mendota, Illinois

AFILIATES:

Conco Engineering Works-Domestic Heating Equipment Conco Building Products, Inc., Brick, Tile, Stone

Lathe Features Speed Preselection



The major design feature of this machine is the Preselector Dyna-Shift. The controls, incorporated in the front of the headstock, consist of a large surface speed setting dial, a large work diameter setting dial, a set of diameter preselectors, a large spindle rpm indicator dial and a knob which frees the spindle from the gear train.

With the controls, the operator sets the dials for work diameter and surface feet per minute. The Dyna-Shift computes rpm and makes the shift automatically and hydraulically to give the correct spindle speed. Trouble-free operation is assured by a manifolding system.

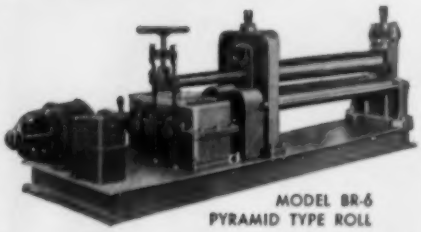
The Series 6 will be offered in four models, all with 20-hp main drive. Drive to the headstock is through multiple V-belts. The motor, mounted on the outside of the machine, can be moved vertically for the adjustment of V-belt tension. The hollow base contains the hydraulic pump and oil sump for supplying hydraulic power to operate the headstock gears.

The machine has been designed for maximum productivity on smaller diameter work as well as heavy stock removal. Thirty-six spindle speeds in a range of 14 to 1750 rpm (a ratio of 1 to 125) have been provided. A new speed may be selected while the spindle is rotating, but the shift into the new speed will not take place until spindle rotation has stopped. Lubrication of all headstock gears and bearings is through a high-pressure mist system. The tailstock utilizes a slow speed for drilling and a fast speed for traversing the 4¼-in. diameter spindle into position quickly. Monarch Machine Tool Co., Sidney, O. Sidney 2-1381

WEBB PLATE FABRICATING MACHINERY

PLATE BENDING ROLLS

The Webb Corporation offers a complete line of Plate Bending Rolls for the rolling of the thinnest plate up to plate 2½" thick. Offered in a variety of lengths and thicknesses. Constructed for the modern fabricating shop.



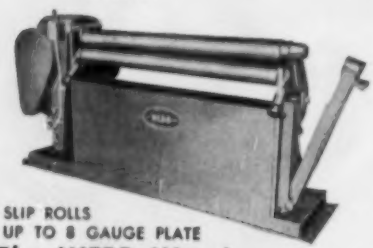
MODEL BR-6
PYRAMID TYPE ROLL

MODEL 9-L
INITIAL PINCH TYPE ROLL

Two types available: the Initial Pinch Type and Pyramid Type machines. All latest advantages of today's modern machine tools are incorporated, utilizing anti-friction bearings, totally enclosed gear drives. Special forming rolls for culvert pipe, stock tanks and other special shapes available.

SLIP ROLLS

A complete line of small Sheet Metal Forming Rolls are also available. All power-driven with shaft sizes 3" to 5" for the handling of the thinnest gauge material, up to 8 gauge material. Special rolls for the forming of polished sheets, aluminum and stainless steels can be furnished. Complete catalogues on any size machine furnished upon request; write Dept. D.



SLIP ROLLS
UP TO 8 GAUGE PLATE

Let Speed PAY–The WEBB Way!

SLIP ROLLS

PYRAMID TYPE ROLL

INITIAL TYPE ROLL

STEELWORKERS

Also Manufacturers of INDUSTRIAL WEIGHING EQUIPMENT

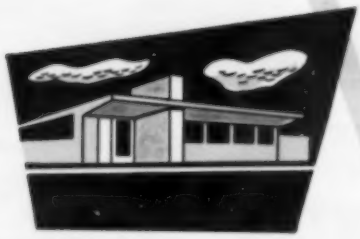
Since 1881 THE WEBB CORP.
WEBB CITY, MO., U.S.A.

MUELLER BRASS CO.

FORGINGS

ARE MADE TO LAST!

QUALITY PARTS AND PRODUCTS FORGED AND MACHINED OF BRASS, BRONZE AND ALUMINUM OR MAGNESIUM



IN THE HOME

IMPELLER DISPOSER

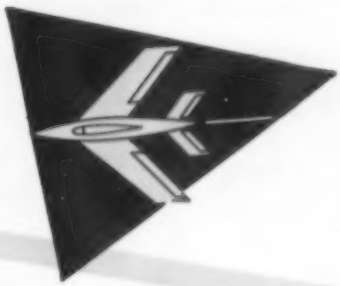
One of four Mueller Brass Co. parts in modern waste disposal unit. Completely dependable in daily operation.

WINDOW HARDWARE

Forged of natural bronze. Can be furnished in aluminum or chrome finish as desired. Retains original beauty indefinitely.

BURNER HEAD

Forged of aluminum for installation in gas stove. Lightweight yet strong.



IN AVIATION

LANDING GEAR TORQUE ARM

SUPPORT MEMBER

INSTRUMENT HOUSING

These aluminum forgings provide the same strength as steel yet weigh only 1/3 as much. Smooth bright surfaces save machining time and eliminate costly finishing.

Specially designed forged housing for sealing diaphragm in aviation pressure warning unit.

IN INDUSTRY

CONNECTING ROD

Forged from "600" series metal. Over two million connecting rods produced without recorded failure.

ACTUATING GEAR

Forged from special Mueller Brass Co. alloy. Must take constant pounding.

AUTOMOTIVE GEAR

Forged of "600" series metal for use in automotive automatic transmission. Replaced part that was giving constant trouble; solved costly problem.

All Mueller Brass Co. forgings, of which just a few are shown here, have a dense, close-grained structure with a high tensile strength. Weight savings up to 40% are possible in the design of parts because of the close tolerances to which they can be produced. Less scrap and longer tool life result from the easy machinability of forged parts. Mueller Brass Co. is completely equipped to design parts for your products, specify alloys (including special alloys developed by our metallurgists), forge, machine, finish and plate the parts and perform all necessary assembly operations. Write today for our free illustrated 32-page forgings catalog and complete information about MBCo forged parts for your products.

140

MUELLER BRASS CO. PORT HURON 19, MICHIGAN

NEW Literature

Write directly to the company for a copy

Wire

Here is a description of equipment for continuous wire drawing and packaging—6 pages. Coulter & McKenzie Machine Co. Inc., 771 Water St., Bridgeport 3, Conn.

Data on Gears

This manual is on the Duti-Rated Lifetime gearing line. All standard gear sets available are listed by center distance and capacity—Engineering Manual DR No. 2, 30 pages. Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago 9, Ill.

Valve Control

This design manual covers valve remote control systems. Diagrams, charts and drawings supplement text—No. 553, 20 pages. Stow Mfg. Co., 63 Shear St., Binghamton, N. Y.

Furnace, Oven Control

A price list and specification catalog is offered. You'll find detailed specifications and engineering data which aid in the selection of pyrometers and control equipment for heat treating, metal processing or other industrial heating applications—bulletin P1260, 48 pages. Bristol Co., Waterbury 20, Conn.

Nitriding Processes

"Nitralloy and Nitriding, Including the New Floe Process" is the name of this booklet. Charts and graphs help define compositions, mechanical properties and case hardening capabilities of four main types of special Nitralloy steels—48 pages. Nitralloy Corp., 230 Park Ave., New York 17, N. Y.

Lathe Operation

How to Run a Lathe covers correct installation and leveling, grinding cutter bits, turning, boring, thread cutting, taper turning, drilling, etc. Use of toolmaker's buttons to locate work on the face plate, use of the steady rest, follower rest, internal grinding attachments and precision gage blocks are discussed—128 pages, 50 cents, paper binding. South Bend Lathe Works, South Bend 22, Ind.

Iron Powder Electrodes

Specifications and performance requirements for electrodes E6024 and E6027 are given for the first time. "Specifications for Mild Steel Arc-Welding Electrodes" covers other standard lightly coated and covered metal types. Details are given on test methods, test requirements, standard sizes and lengths, packaging and marking—24 pages, 40 cents. American Welding Society, 33 W. 39th St., New York 18, N. Y.

Plastic Tooling

"A Manual for Reinforced Plastics Tooling" describes fabrication and suggests uses—Marblette Corp., 37-21 30th St., Long Island City 1, N. Y.

FILMS

Jig Borers

"Accent on Accuracy" shows the advantages of using this make of jig borers—16 mm, color, 28 minutes. Pratt & Whitney, division, Niles-Bement-Pond Co., West Hartford 1, Conn.

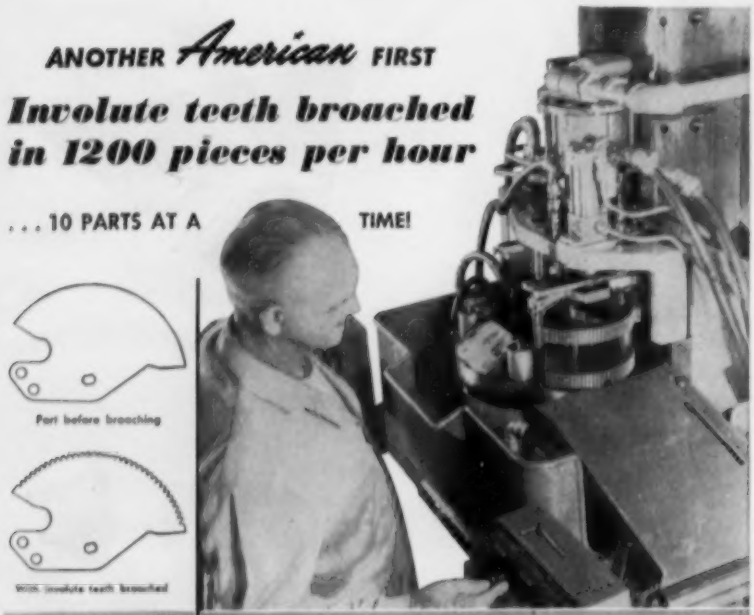
Production Tooling

This film tells the story of some of the difficult tooling problems solved with the contour cutting band saw machine—16 mm, color. Industrial Films Div., DoAll Co., 254 North Ave., Des Plaines, Ill.

ANOTHER *American* FIRST

Involute teeth broached in 1200 pieces per hour

. . . 10 PARTS AT A TIME!



Part before broaching

With involute teeth broached

An indexing fixture, equipped with two loading stations and automatic clamping, is mounted on an American 3-way machine to perform this specialized high production broaching operation. While one station is broaching, the operator stacks 10 parts at the other station. The stack is automatically indexed into broaching position and then clamped. At end of the broaching stroke, the stack is indexed and discharged into a chute by an automatic air ejection unit.

The low piece cost obtained on this machine, is an example of the economies that American gives you — by supplying a machine completely tooled with work-holding fixtures and broaches.

Why not put American to work on *your* broaching problem. A parts print or sample will receive prompt attention. Or write for catalog 450. It is an informative manual on all phases of broaching.

AMERICAN *American* BROACH & MACHINE CO.

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

SUNDSTRAND

SUPERIOR

STAINLESS STRIP STEEL

the beauty-bright trim

that's solid clear through

that cleans with a wipe

that never needs care

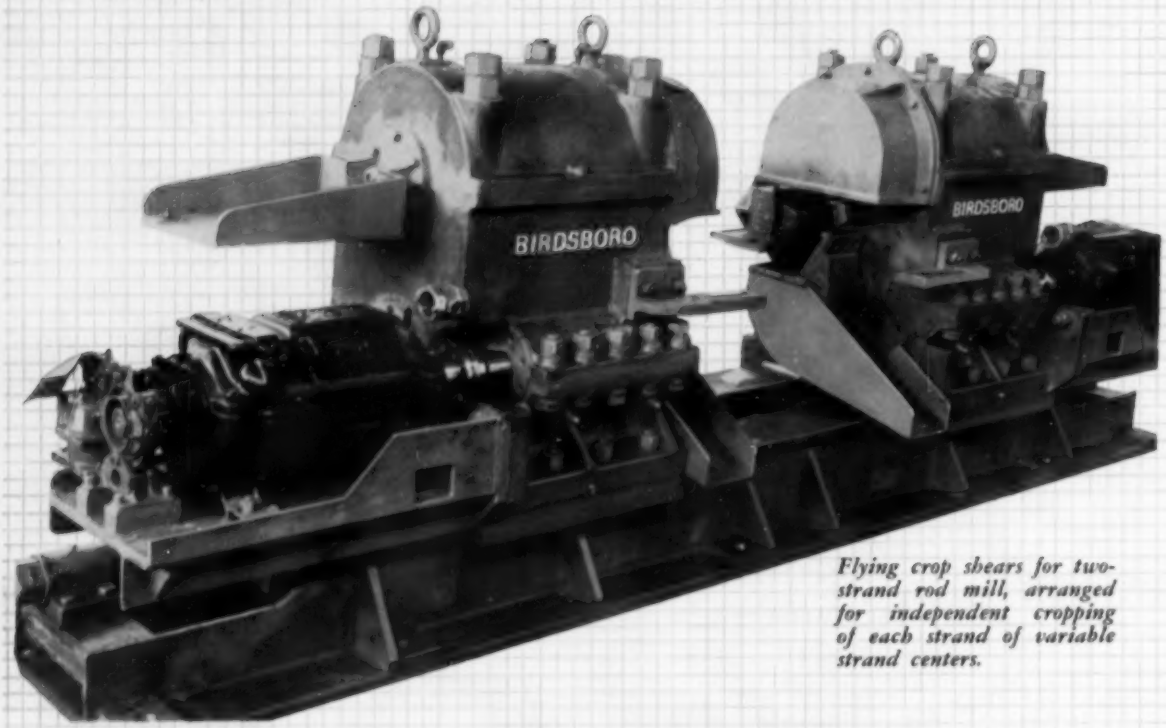
that sells in the store

and serves in the home

SUPERIOR Stainless Strip Steel is available in a range of grades, with dimensions, tempers and finishes to meet your requirements. *Write for details.*

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

DESIGNED FOR ACCURACY



Flying crop shears for two-strand rod mill, arranged for independent cropping of each strand of variable strand centers.

BUILT FOR SPEED

BIRDSBORO CROPPING SHEARS

Designers and Builders of:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

Whether it's a standard piece of equipment or still in the "idea stage" . . . BIRDSBORO engineers can design and build efficient steel mill auxiliary machinery to meet your specific needs. Your plant may be the next to benefit from the experience and ingenuity of BIRDSBORO engineers. Send us your requirements today.

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

STEEL
March 21, 1955

Market Outlook

CONSUMER pressure for finished steel is spreading rapidly beyond the confines of automotive and related consumption. While this group still provides the major support to overall demand on the mills, construction is opening up at a promising pace. Result: An increasing tightness on the heavier products, such as plates and shapes. Bearing and sheet steel piling demand is up markedly, with seasonal requirements only starting.

Up to now extended deliveries have largely prevailed in sheets and strip, notably cold-rolled and galvanized. Now shipment promises on plates and structurals, especially wide-flange sections, are lengthening. The same is true of bar stock.

DEMAND BROADENS—This indicates demand is widening in other important consuming lines. Expanding requirements for building, line pipe, tank and similar construction, of course, are seasonal. But there is every indication these fields will provide volume demand this year that will rank close to the record, if not exceed it. At the same time, such lines of manufacture as appliances and general fabrication are providing sturdy demand.

SHEET SUPPLY TIGHT— While automotive buying of sheets is likely to sag along toward the end of the second quarter, producers of cold-rolled still are being pressed for more second quarter tonnage than they can handle for that period. Some deliveries now extend into the third quarter. Certain makers are virtually sold out for the coming three months and suggest use of hot-rolled pickled sheets for May and June shipment in lieu of cold-rolled where feasible.

Manufacturers may be seeking to replenish depleted inventories. In any event, some producers incline to the view that consumers are ordering tonnage beyond actual requirements.

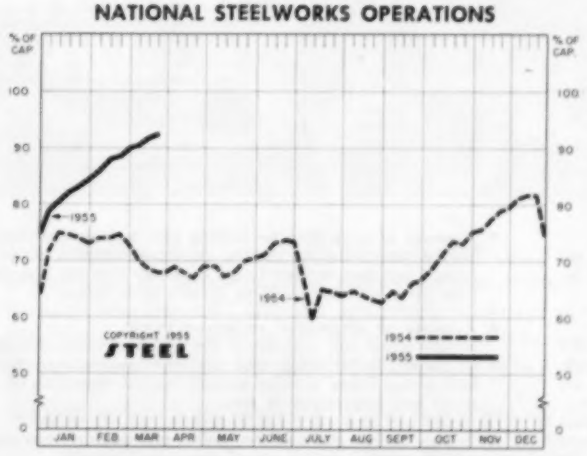
IMPORTS FADING—Apart from some wire products, furring channels and seamless casing, deliveries on most steel products imported from Europe have become so extended as to practically eliminate their sale in this market. Items include deformed bars, bar-sized angles, structural angles, I-beams, wide-flange beams, merchant bars and hot-rolled bands.

PRODUCTION—Indications are March will be a near-record production month. Last week the national ingot rate inched up another full point, hitting 92.5 per cent of capacity, the highest since mid-October, 1953. Currently, the furnaces are pouring steel at a rate of 2,232,000 tons weekly. February production totaled 8,503,000 net tons, down 335,000 tons from January because of the shorter month, but 1.4 million tons above February a year ago.

At the start of this year the steel industry projected expenditures of $695 million for 1955 facilities expansion. This figure, reportedly, now is being upped substantially as the steelmakers seek to round out equipment to meet the exacting requirements of consumers.

PRICES FIRM— Except for an increase of $5 a ton on standard structural shapes to 4.20c, mill, by the Phoenix Iron & Steel Co. last week, the market is featureless pricewise. Scrap is showing a varying price trend.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Mar. 20	Change	Same Week 1954	Same Week 1953
Pittsburgh	93	— 0.5*	73	106
Chicago	97.5	0*	79	104
Mid-Atlantic	89	0	62	97
Youngstown	96	+ 1	66	108
Wheeling	93.5	+ 1	79.5	100
Cleveland	96	— 2*	61	100
Buffalo	99	+ 6.5	63.5	106.5
Birmingham	87.5	+ 1	83	98
New England	85	+ 5	60	88
Cincinnati	90.5	+ 5.5	71.5	101
St. Louis	87	— 9	43.5	88
Detroit	88	0	84	106
Western	94	— 2	73	106.5
National Rate	92.5	+ 1	68	101

INGOT PRODUCTION‡

	Week Ended Mar. 20	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	138.9†	139.5	133.8	100.4
NET TONS (In thousands)	2,232†	2,241	2,150	1,613

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 67 Technical Outlook—p. 115

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Mar. 15 1955	Mar. 8 1955	Month Ago	Feb. Average
(1947-1949=100)	144.7	144.7	144.7	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.525
Rails, Light, 40 lb	5.917
Tie Plates	5.275
Axles, Railway	7.500
Wheels, Freight Car, 33 in. (per wheel)	48.500
Plates, Carbon	4.675
Structural Shapes	4.517
Bars, Tool Steel, Carbon (lb)	0.430
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.525
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., Alloy	6.875
Bars, H.R., Stainless, 303 (lb)	0.423
Bars, H.R., Carbon	5.000
Bars, Reinforcing	4.963
Bars, C.F., Carbon	5.160
Bars, C.F., Alloy	11.375
Bars, C.F., Stainless, 302 (lb)	0.488
Sheets, H.R., Carbon	4.870
Sheets, C.R., Carbon	5.864
Sheets, Galvanized	7.220
Sheets, C.R., Stainless, 302 (lb)	0.553
Sheets, Electrical	$9.350
Strip, C.R., Carbon	7.493
Strip, C.R., Stainless, 430 (lb)	0.415
Strip, H.R., Carbon	5.113
Pipe, Black, Buttweld (100 ft)	15.000
Pipe, Galv., Buttweld (100 ft)	18.605
Pipe, Line (100 ft)	146.804
Casing, Oil Well, Carbon (100 ft)	154.216
Casing, Oil Well, Alloy (100 ft)	227.676
Tubes, Boiler (100 ft)	‡
Tubing, Mechanical, Carbon	‡
Tubing, Mechanical, Stainless, 304 (100 ft)	161.193
Tin Plate, Hot-dipped, 1.25 lb	8.533
Tin Plate, Electrolytic, 0.25 lb	7.223
Black Plate, Canmaking Quality	6.333
Wire, Drawn, Carbon	7.938
Wire, Drawn, Stainless, 430 (lb)	0.645
Bale Ties (bundle)	5.800
Nails, Wire, 8d Common	7.615
Wire, Barbed (80-rod spool)	7.097
Woven Wire Fence (20-rod roll)	16.813

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Mar. 16 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 avg.=100)	194.53	194.53	194.53	189.74	156.13
Index in cents per lb	5.270	5.270	5.270	5.140	4.230

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$118.23	$118.23†	$117.82	$113.73	$93.18
No. 2 Fdry, Pig Iron, GT	56.54	56.04	56.54	56.54	46.47
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.97
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	37.50	37.33	37.33	34.33	28.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Mar. 16 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.45
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.45
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.93
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	4.10-4.15
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.40
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.40
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.42
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.50
Plates, Chicago	4.225	4.225	4.225	4.10	3.50
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.10	3.60
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.50
Plates, Claymont, Del.	4.225	4.225	4.225	4.10	3.60
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.35
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.35
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.10
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.30
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.15
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.30
Strip, C.R., Detroit	5.90	5.90	5.90	5.45-6.05	4.35-.40
Wire, Basic, Pitts.	5.75	5.75	5.75	5.525	4.50
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.55	5.30
Tin Plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$63.00
Wire Rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.675	4.675	4.675	4.525	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	59.66	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	55.16	55.16	55.16	60.16	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	49.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$38.50	$38.50	$36.50	$25.50	$32.00
No. 1 Heavy Melt, E. Pa.	39.00	39.50	38.00	22.00	24.00
No. 1 Heavy Melt, Chicago	35.00	34.00	34.00	25.50	28.00
No. 1 Heavy Melt, Valley	37.50	37.50	36.50	23.50	31.75
No. 1 Heavy Melt, Cleve.	35.00	35.50	34.00	20.50	28.25
No. 1 Heavy Melt, Buffalo	32.50	32.50	32.00	24.00	28.25
Rails, Rerolling, Chicago	49.50	49.50	49.50	36.50	45.50
No. 1 Cast, Chicago	40.00	40.00	40.00	33.00	41.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$14.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	16.75	16.00

Daily Nonferrous Price Record

	Price Mar. 16	Last Change	Previous Price	Feb. Avg.	Jan. Avg.	Mar. 1954 Avg.
Copper	33.00	Jan. 28, 1955	30.00	33.000	30.180	29.685
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.735
Zinc	11.50	Sept. 3, 1954	11.00	11.500	11.500	9.657
Tin	91.25	Mar. 15, 1955	90.75	90.906	87.280	92.518
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	23.200	22.900	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99+%, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

For the right finish start with Simonds Roll Grinding Wheels. Fast, cool, free cutting action. Used for regrinding and refinishing everything from giant back-up and work rolls to small jewelers rolls. Borolon (aluminum oxide abrasive) for steel and alloy steel rolls. Electrolon (silicon carbide) for chilled iron, cast iron, brass, copper and non-metallic rolls. Write for free bulletin ESA 237 "Roll Grinding Wheels for Surface Accuracy"

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Nonferrous Metals

Aluminum, copper, zinc and nickel are in a turmoil now because of shortages in some areas and price uncertainties in others. But the worst could be over by midyear

Nonferrous Metal Prices, Pages 166 & 167

DON'T LET ANYBODY tout you into making rash bets on the nonferrous markets. Even dope straight from the horse's mouth can't tell you what's going to happen next in three or four of the major metals.

Take aluminum, for instance. You'll hear there's a shortage. Then you'll hear there isn't. A lot depends on the company involved. Few plants have had to shut down because of a lack of aluminum, but many are feeling a pinch in their inventories. One or two aluminum fabricators are reported to have gone to the government for help in the face of a threatened shutdown. They got help, either from the government or through governmental intercession with a prime producer.

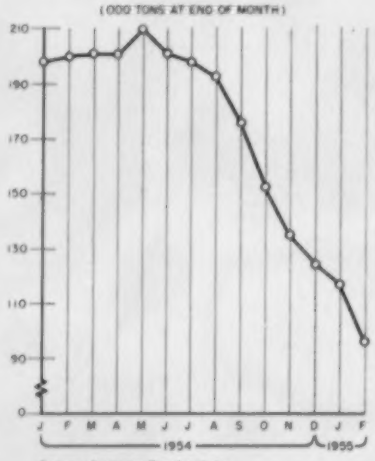
Easing the Pinch—The squeeze on the light metal will probably last until midyear, but then it should ease up. Of course, the government could step in at any time and loosen stockpile commitments or restrict scrap exports, both of which seemed imminent at presstime. In such event, you can look for a rapid change almost immediately. Why? In the first place, more metal will be made available. Secondly, users may have greater assurance of delivery and perhaps back off somewhat on their inventory buying.

Best bet is to play it as close to the chest as possible, getting along on the amount of aluminum you need for current operations and trying to keep inventory needs within reason. That way there should be metal enough to go around.

Et Tu, Copper?—Take copper as another "for instance." If you can sweat it out until third quarter, you should be safe the rest of the year, despite whatever happens in Rhodesia. But don't bet on that either. New capacity coming in now and throughout the year should start having its effect within the next two months. Release of some stockpile-destined copper and scrap export restrictions should add a little to the relief. But if the Chilean workers strike this week, things will get worse. However, the Chilean government doesn't want the strike.

Suppose the best happens for once: Rhodesian metal comes back into the market in June; Chilean production continues without interruption; domestic production increases as expected. *IF* those things happen, copper users can look for better balance between supply and demand—but don't hold your breath until then.

SLAB ZINC STOCKS
Best level since 1952



Source: American Zinc Institute

Don't Forget Zinc—Then there's zinc. Consumption is on a high level right now, resulting in a squeeze on the higher grades and a reduction in stocks (see chart). Latest statistics from the American Zinc Institute show that for the first time in many months, stocks would have been liquidated because of consumer demand even without the help of governmental purchasing. From Jan. 31 to Feb. 28, the total reduction was 20,995 tons. The government took only 16,205 tons, meaning that domestic consumers accounted for 4790 tons of the decrease. That's not bad for a short month. March looks just as good, with the government taking even less than in February. The first half could show up as one of the best ever. But an automotive strike could spoil an otherwise sparkling year. There is still the possibility the government will not renew its stockpile program for lead and zinc June 30, which could tumble the beautiful dreams.

Next there's nickel, which has problems all its own. The government is threatening to investigate the industry to see why it is using 1 million lb a month more nickel than the government estimated it would. Some industrymen say priority ratings are not being abused, and there's no need for investigation. In addition, the industry has to keep its civilian customers happy. While the extra metal handed out by Office of Defense Mobilization in the first quarter helped, it didn't solve the shortage problem a nickel's worth. Designers still are not confident enough of the continuing supply to design for nickel. It looks right now as if the government will continue to hand out extra civilian nickel through the second quarter, but you can't plan on that until it happens.

Prices Firm, But—What about price? The market is firm as of now, but that doesn't say a thing about tomorrow. Copper is anybody's guess. There are persistent rumors about 36-cent copper, but nobody will admit to any plans for it now. But as long as London metal sells at 10 cents or more above domestic metal, you have to reckon with the pressure to increase. Many people say our market is independent of London, but most of them have the latest London Metal Exchange quotations in their hands when they say it.

Aluminum could move just as easily, but for different reasons. Most producers still hope to make money on ingots some day, and with the market tight and secondary prices high, they could figure this is the time to do it. They say the primary price has not yet risen enough to cover advancing production and labor costs. But nobody will admit planning the increase.

Complexities—In zinc, the situation is complex. It's no secret that producers would like to get more money for high and special high grade metal but the price is pegged to prime western, which is overproduced. There is a persistent rumor that the increase on the former will come anyway, resulting in a two-price system for zinc. But again, producers deny it.

Nickel showed an advance in Canada earlier this month, but the domestic price will not be affected, spokesmen say. The hike was an effort to bring the U. S. and Canadian dollar values closer in line for the metal.

(Advertisement)

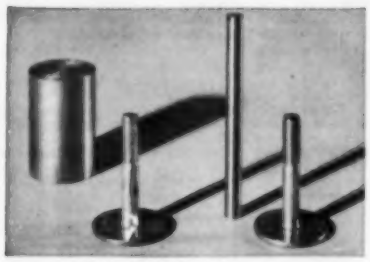
BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co.

Reporting new developments in copper-base alloys and metalworking methods.

Cold Heading Cuts Metal Requirements 96%



Part at left was machined from rod. Piece at right was formed by Camcar Cold-Flow process from Bridgeport wire stock. Note the large head produced from the relatively small diameter stock. (Courtesy, Camcar Screw & Mfg. Corp., Rockford, Ill.)

When a midwestern manufacturer machined the special screw fastenings pictured above from solid bar stock, he used 210 pounds of metal per thousand pieces produced. Of this, approximately 200 pounds went into scrap as screw machine turnings.

By changing to advanced cold-forming techniques, the same manufacturer now makes a thousand pieces of the same product from only 8.3 pounds, *a metal saving of 96%*. Too, his cold-headed product is stronger and made to closer tolerances than its machine-turned counterpart.

This is just one example from many hundreds where the switch to cold forming brought both tremendous savings and product improvement at the same time. The process is precise, fast and efficient, ideally suited to close-dimensional, high-speed mass production.

In order for the cold-forming process to work, the metal has to be specially selected for its cold-working properties as well as the qualities wanted in the finished product.

Bridgeport produces a number of carefully finished alloys particularly suited to the severe working requirements of the cold-forming operation and well recommended for their finished properties. One of them is Bridgeport Silicon Bronze, Alloy No. 609.

Exceptionally malleable, even when hard drawn, Bridgeport Silicon Bronze is excellent for all types of cold-headed and roll-threaded products, particularly the extremely large-headed bolts as those described above. Its finished strength can reach 100,000 psi tensile, yet when properly made, parts require no heat treatment after forming. And the high resistance to stress corrosion recommends Silicon Bronze highly for outdoor construction.

Round ID, Hex OD Tube Permits 26% Cost Saving

Illinois Engineering Co., Chicago, a division of American Air Filter Co., used to machine the inlet connection lock nut for their Thermostatic Radiator Traps from solid hex brass rod. Though this method is not unusual, it required excessive machining time and scrap losses were high.

Bridgeport round ID, hex OD tube cut 26% from production costs of radiator trap lock nut.

Bridgeport's Technical Service recommended Round ID, hex OD brass tube as a more economical material. The results: a marked saving in metal and, except for threading, the complete elimination of machining on the inside of the nut. *Costs were reduced 26%.*

This is a typical example of how Bridgeport Technical Service can increase profits by reducing costs. Chances are there are a number of similar opportunities for savings around your plant.

Bridgeport Technical Service engineers are at your call to help turn up just such opportunities. The answer might be a switch to another of the complete line of alloys Bridgeport manufactures for screw machine operations — or it could be a switch in mill shape: rod to tube, tube to wire, etc.

In either case, savings can be made when Bridgeport Technical Service is on the job.

Bridgeport Phosphor Bronze makes lifetime spring contact for attachment plug.

Spring Parts That Last a Lifetime

An important factor in many electrical devices is spring parts that go right on flexing year after year without losing their resiliency. That's exactly what Hopax Electric, New York, built into their new type attachment, the Hopax Circuit Breaker Plug, using Bridgeport Phosphor Bronze.

An engineered alloy with exceptional spring properties, Bridgeport Phosphor Bronze, Alloy No. 36, Grade A, gives unusual service life under repeated flexing. Its fatigue and wear resistance is high . . . it withstands arcing better than brass . . . and its corrosion resistance and higher conductivity are positive advantages over rustable material.

Bridgeport Phosphor Bronze No. 36, Grade A — and No. 35 Grade C, for more severe use — are recommended for dependable use in electrical snap switches, diaphragms, current collectors, spring contacts and many other electrical components. To find out how they can work for you, check with your Bridgeport representative today. (3380)

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BRIDGEPORT BRASS COMPANY ♦ BRIDGEPORT, CONNECTICUT

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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 25.00; No. 43, 5% Si, 24.80; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.20; No. 195, 4.5% Cu, 0.8% Si, 25.50; No. 214, 3.8% Mg, 26.20; No. 356, 7% Si, 0.3% Mg, 24.90.

Antimony: R.M.M. brand, 99.5%, 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $118.30 per lb, nom.

Copper: Electrolytic 33.00 deld. Conn. Valley, 33.00 deld. Midwest; Lake 33.00 deld; Fire refined 32.75 deld.

Germanium: 99.9%, $294.84 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $10-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more, f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $322-$324, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3-$3.25 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.60; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.02.

Osmium: $120-$130, nom., per troy oz.

Palladium: $17-$20 per troy oz.

Platinum: $76-$80 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$56 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Silver: Open market, 85.25 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod $68.70 per lb; powder $40.20 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 91.25, prompt 91.125.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max) $4.50, grade A-2 (0.5% Fe max) $4 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots $4.35-$4.40 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 29.50-31.75; No. 12 foundry alloy (No. 2 grade) 29.25-30.50; 5% silicon alloy, 0.60 Cu max, 31.25-32.25; 13 alloy, 0.60 Cu max, 31.25-32.25, 195 alloy 30.75-33.00; 108 alloy 30.00-31.00; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 30.75-32.50; grade 2, 30.00-31.50; grade 3, 29.25-30.50; grade 4, 28.75-29.50.

Brass Ingot: Red brass No. 115, 34.00; tin bronze No. 225, 45.50; No. 245, 39.25; high-leaded tin bronze No. 305, 38.00; No. 1 yellow, No. 405, 29.75; manganese bronze No. 421, 32.25.

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 34.00; AZ91C, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.71; rod, bar, wire, $1.68.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 38.35-39.85; 30,000-lb lots, 38.48-39.98; l.c.l. Weatherproof, 100,000 lb, 38.53-39.65; 30,000 lb, 38.78-39.90; l.c.l. 39.28-40.40. Magnet wire deld., 15,000 lb or more 44.99-46.57; l.c.l. 45.74-47.32.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more $20 per cwt; pipe, full coils $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 19.00-20.50; plates 18.00-23.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	123	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0	...	...
0.156-0.172	53.9	52.3	...	...
0.188	53.9	52.3	...	66.8
0.219-0.234	51.1	49.5	...	...
0.250-0.281	51.1	49.5	...	63.7
0.313	51.1	49.5	...	60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	53.1	50.6
1.063	48.7	46.3	...	48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4	...	...
1.625-2.000	45.1	42.8	...	47.3
2.125-2.500	44.0	41.7	...	...
2.563-3.375	42.7	40.5	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	35.9	40.4	...	...
0.135-0.096	36.4	41.3	...	...
0.095-0.077	37.1	42.3	34.6	39.6
0.076-0.661	37.7	43.2	34.8	39.8
0.060-0.048	38.2	43.6	35.1	40.2
0.047-0.038	38.7	44.5	35.6	40.6
0.037-0.030	39.1	45.0	36.0	41.3
0.029-0.024	39.7	45.5	36.3	41.6
0.023-0.019	40.4	46.9	37.1	42.6
0.018-0.017	41.2	...	37.7	43.5
0.016-0.015	42.1	...	38.5	44.7
0.014	43.1	...	39.5	46.0
0.013-0.012	44.3	...	40.2	47.0
0.011	45.3	...	41.4	48.6
0.010-0.0095	46.5	...	42.5	50.3
0.009-0.0085	47.8	...	44.0	52.3
0.008-0.0075	49.4	...	45.2	54.1
0.007	50.9	...	46.7	56.4
0.006	52.5	...	48.1	61.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.6	38.8
5050-F	35.7	39.9
3004-F	36.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.0
2024-T4*	41.8	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or diam, 72-180 in. lengths.

ALUMINUM

Forging Stock: Round, Class 1, 47.80-37.30, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.60-41.00 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.10	2	$ 49.50
1	25.35	4	136.65
1½	34.30	6	244.90
1½	41.60	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 53.00, 20,000 lb or more, 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ⅛-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings 18.00-18.50; old sheet 15.50-16.00; borings and turnings 9.50-10.00; crankcases 15.50-16.00; industrial castings 15.50-16.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f	
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	51.76b	49.36	....	51.82	29.000	29.000	28.250
Yellow Brass	44.27	44.21	44.81	47.18	21.875	21.625	20.125
Red Brass, 85%	48.44	48.36	48.96	51.25	25.500	25.250	24.750
Low Brass, 80%	47.35	47.29	47.89	50.16	24.625	24.375	23.875
Naval Brass	48.18	42.49	55.24	51.34	20.250	20.000	19.500
Com. Bronze, 90%	50.08	50.02	50.63	52.64	26.625	26.375	25.875
Nickel Silver, 10%	58.25	62.25	60.58	....	34.000	25.750	13.000
Phos. Bronze, A, 5%	70.12	70.62	70.62	71.80	29.375	29.125	28.125
Silicon Bronze	55.94	55.13	55.96	57.86e	28.000	27.750	27.000
Manganese Bronze	51.92	46.02	58.46	....	20.375	20.125	19.500
Munts Metal	46.34	42.15	....	....	20.625	20.375	19.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire No. 1 30.00-31.00; No. 2 copper 29.00-29.50; light copper 27.00-27.50; No. 1 composition red brass 24.00-24.50; No. 1 composition turnings 23.00-24.00; yellow brass turnings 16.00-16.50; new brass clippings 20.50-22.00; No. 1 brass rod turnings 17.50-19.00; light brass 14.50-17.00; heavy yellow brass 17.50-18.50; new brass rod ends 18.50-20.00; auto radiators, unsweated 18.50-19.50; cocks and faucets 19.50-20.50; brass pipe 19.50-20.50.
Lead: Heavy 11.50-11.75; battery plate 6.00-6.75; linotype and stereotype 13.50-14.25; electrotype 12.00-12.50; mixed babbitt 12.00-14.00.
Magnesium: Clippings 18.50-19.50; clean castings 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.
Monel: Clippings 28.00-35.00; old sheet 26.00-33.00; turnings 21.00; rods 28.00-35.00.
Nickel: Sheets and clips 57.00-60.00; rolled anodes 57.00-65.00; turnings 40.00-45.00; rod ends 57.00-65.00.
Tin: No. 1 pewter 50.00-55.00; block tin pipe 70.00-75.00; No. 1 babbitt 45.00-48.00.
Zinc: Old zinc 4.75-5.50; new die cast scrap 4.75-5.00; old die cast scrap 3.25-3.50.

REFINERS' BUYING PRICES
(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings 19.50-21.50; 3003 clippings 19.50-21.50; 6151 clippings 19.50-21.50; 5052 clippings 19.50-21.50; 2014 clippings 19.00-20.50; 2017 clippings 19.00-21.00; 2024 clippings 19.00-20.50; mixed clippings 18.75-20.50; old sheet 17.50-19.50; old cast 17.50-19.50; clean old cable (free of steel) 19.50-21.50; borings and turnings 18.00-20.00.
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 45.00; light scrap 40.00.
Copper, Brass: No. 1 copper 33.50; No. 2 copper 32.00; light copper 30.25; refinery brass (60% copper) per dry copper content 28.00-28.50.

INGOTMAKERS' BUYING PRICES
(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 32.50-33.50; No. 2 copper 31.00-32.00; light copper 29.00-30.25; No. 1 composition borings 26.50-27.25; No. 1 composition solids 26.50-26.75; heavy yellow brass solids 21.00; yellow brass turnings 20.50; radiators 21.00-22.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.
Copper: Flat-rolled 48.42, oval 47.92, 5000-10,000 lb; electrodeposited 42.78, cast 45.04, 2000-5000-lb lots.
Nickel: Depolarized, less than 100 lb $1.015; 100-499 lb 99.50; 500-4999 lb 95.50; 5000-29,999 lb 93.50; 30,000 lb 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.
Tin: Bar or slab, less than 200 lb $1.085; 200-499 lb $1.08; 500-999 lb $1.075; 1000 lb or more $1.07.
Zinc: Bar 20.00, bar or flat top 19.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.
Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.
Copper Cyanide: 100 lb 71.80; 200 lb 71.05; 300 lb 70.80; 400-900 lb 70.05; 1000 lb and over 68.05, effective Feb. 11, 1955.
Copper Sulphate: Crystal, 100 lb 20.50; 200 lb 17.50; 300 lb 16.50; 400 lb 16.00; 500-1900 lb 14.50; 2000 to 10,000 lb 14.25; 10,000 lb and up 14.15. Powder, add 0.5 to above prices. Effective Jan. 31, 1955.
Nickel Chloride: 100 lb 46.50; 200 lb 44.50; 300 lb 43.50; 400-4900 lb 41.50; 5000-9900 lb 39.50; 10,000 lb and over 38.50. All prices eastern delivery, effective Jan. 1, 1955.
Nickel Sulphate: 100 lb 38.25; 200 lb 36.25; 300 lb 35.25; 400-4900 lb 33.25; 5000-35,900 lb 31.25; 36,000 lb 30.25. All prices eastern delivery, effective Jan. 1, 1955.
Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.
Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.
Sodium Stannate: Less than 100 lb 70.10; 100-600 lb 55.90; 700-1900 lb 53.40; 2000-9900 lb 51.70; 10,000 lb or more 50.60.
Stannous Chloride (Anhydrous): Less than 50 lb $1.558; 50 lb $1.218, 100-300 lb $1.068, 400-900 lb $1.043; 1000-1900 lb $1.019; 2000-4900 lb 98.20; 5000-19,900 lb 92.10, 20,000 lb and over 86.00.
Stannous Sulphate: Less than 5 lb $1.258; 50 lb 95.80; 100-1900 lb 93.80; 2000 lb and over 91.80.
Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.

Specify *Michigan* Tubing for economy and versatility

This gasoline tank filler tube has the overflow pipe brazed to the filler tube at two points and the fastener clamps projection welded to the tube. The cam is spot welded to the tube mouth.

Vacuum cleaner handle with cord holder welded to tubing and elongated hole punched for interior wire and tumbler switch, ready for chrome finish and assembly to the vacuum cleaner.

The muffler inlet pipe above shows how Michigan workmanship performs several intricate fabricating operations to most exacting tolerances.

The meticulous workmanship that goes into every piece of Michigan tubing is well illustrated by this washing machine center tube shaft where absolutely accurate finishing to the closest tolerance is required.

ROUND
¼" to 4" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
⅜" to ¾"	16 thru 22	¾" minimum side to 5" maximum side
¾" to 1"	11 thru 22	
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

For almost 40 years

Michigan has been manufacturing tubular parts for leading manufacturers. This acceptance of Michigan tubing has been won by meticulous attention to customer requirements and the supplying of the very best in tubing. The following advantages of low cost manufacture and utmost dependability are yours when you specify Michigan for tubular parts in the fabrication of your products.

1. It is fabricated in round, square and rectangular shapes, in a wide range of sizes;
2. It is always of uniform strength, weight, ductility and weldability;
3. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted and rolled.
4. It can be formed or machined in your plant or prefabricated at Michigan.

Consult Michigan

for engineering and technical help in the selection of tubing best suited to your needs.

RESISTANCE WELDED STEEL TUBING
Michigan STEEL TUBE PRODUCTS CO.
THE OLDEST NAME IN ELECTRIC

Nearly 40 Years in the Business
9450 BUFFALO ST. • DETROIT 12, MICH.
FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland Co., Dayton, Ohio—Service Steel Co., Los Angeles, Calif.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Globe Supply Co., Denver, Colorado—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.—Harry E. Clark & Co., Houston, Texas—C. I. Crais Co., Birmingham, Ala.

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company. Key on page 169. Key to footnotes, page 171.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)
Detroit R7 .....$65.00
Houston S5 .....70.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 .....64.00
Bridgeport,Conn. N19 ..69.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2..64.00
Munhall,Pa. U5 .....64.00
Pittsburgh J5 .....64.00
So.Chicago,Ill. R2, U5..64.00
So.Duquesne,Pa. U5 ...64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$76.00
Bessemer,Pa. U5 .....78.00
Bridgeport,Conn. N19 ..83.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 ....78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 ....78.00
Houston S5 .....83.00
Johnstown,Pa. B2 ....78.00
Lackawanna,N.Y. B2..78.00
LosAngeles B3 .....87.50
Midland,Pa. C18 .....78.00
Munhall,Pa. U5 .....78.00
Pittsburgh J5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14..78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 .....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....91.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 .....86.00
Lackawanna,N.Y. B2..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago, R2,U5,W14..86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP
Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
SparrowsPoint,Md. B2..3.90
Warren,O. R2 .....3.90
Youngstown R3, U5 ....3.90

WIRE RODS
AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....4.925
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 ....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....4.925
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ...5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 ....4.675
SparrowsPoint,Md. B2..4.775
Sterling,Ill.(1) N15 ...4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
Torrance,Calif. C11 ....5.475
Worcester,Mass. A7 ..4.975

STRUCTURALS

Carbon Steel Stand. Shapes
Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 ....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.30
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Newport,Ky. N9 .....4.25
Pittsburgh J5 .....4.25
Riverdale,Ill. A1 .....4.25
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.25
So.Chicago R2, U5, W14..4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ..4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2,U5,Y1..4.225

Wide Flange
Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....4.30
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.25
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston S5 .....6.45
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14..6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES
Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 .....5.075

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Bridgeport,Conn. N19 ..4.475
Buffalo R2 .....4.225
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5, R2 ....4.225
Coatesville,Pa. L7 ....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.325
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill.G4 .... 4.425
Harrisburg,Pa. C5 ....4.225
Houston S5 .....4.275
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 ....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ..5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago R2, U5, W14..4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ..4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2,U5,Y1..4.225

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 ....6.025
Geneva,Utah C11 ....5.375

PLATES, Wrought Iron
Economy,Pa. B14 ....9.80

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 ....6.45
Coatesville,Pa. L7 ....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif. (30) K1..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston S5 .....6.50
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy
Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 ....5.80
Fontana,Calif. K1 ....6.45
Gary,Ind. U5 .....5.80
Houston S5 .....5.85
Ind.Harbor,Ind. Y1 ....5.80
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2..5.80
Youngstown Y1 .....5.80

FLOOR PLATES
Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 .....5.275
Ind.Harbor,Ind. I-3 ....5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 .....5.275

PLATES, Ingot Iron
Ashland c.l. (25) A10..4.475
Ashland l.c.l (15) A10 4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 ....4.825

BARS

BAR, Hot-Rolled Carbon
Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Bridgeport,Conn. N19 ...4.55
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.40
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.55
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Midland,Pa. C18 .....4.30
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.30
Pittsburg,Calif. C11....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23 ..5.05
So.Chicago, R2,U5,W14..4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 ....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....5.075
Bridgeport,Conn. N19..5.325
Buffalo R2 .....5.075
Canton,O. R2, T7 ....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.175
Fontana,Calif. K1 ....6.125
FairlessHills,Pa. U5 ..5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1..5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2, U5,W14 5.075
So.Duquesne,Pa. U5 ..5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS, H.R. Leaded Alloy
Warren,O. C17 .....5.825

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.55
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.70
Ind.Harb.,Ind, I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....6.70
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ....6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.45
KansasCity,Mo. S5 .....5.45
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12,R2 5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 .....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.40
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13 .5.40
Hartford,Conn. R2 ....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ....6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ...5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.65
Putnam,Conn. W18 ....5.95
Readville,Mass. C14 ....5.95
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 ....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..4.65

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 ....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 ....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. F7 .....6.625
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2 ..6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ...6.925
Massillon,O. R2, R8 ..6.625
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ...6.925
Youngstown F3, Y1 ....6.625

BARS, C.F. Leaded Alloy
Ambridge,Pa. W18 ....7.525
Camden,N.J. P13 .....7.70
Carnegie,Pa. C12 .....7.525
Chicago W18 .....7.525
Cleveland C20 .....7.525
Monaca,Pa. S17 .....7.525
Newark,N.J. W18 .....7.70
SpringCity,Pa. K3 .....7.70
Warren,O. C17 .....7.525

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
FairlessHills,Pa. U5 ....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston S5 .....4.55

Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.55
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....5.00
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SandSprings,Okla. S5 ...4.80
Seattle B3, N14, P23 ...5.05
So.Chicago R2 .....4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFrancisco B3 ....5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown R2, U5 ....4.30

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2..5.70
KansasCity,Kans. S5 ...6.50
LosAngeles R3 .....5.95
Marion,O. P11 .....5.55
Pittsburgh J5, U5 .....5.72
Seattle B3, N14, P23 ...6.15
So.SanFrancisco B3 ....6.00
SparrowsPt. ½-1" B2 ..5.70
Williamsport,Pa. S19 ...5.60

RAIL STEEL BARS

Avis,Pa.(3) J5 .....4.25
ChicagoHts.(3) C2, I-2..4.20
ChicagoHts.(4) C2, I-2..4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa.(3) F5 ....4.20
Franklin,Pa.(4) F5 ....4.30
Marion,O.(3) P11 ....4.20
Moline,Ill.(3) R2 .....4.30
Tonawanda(3) B12 .....4.15
Tonawanda(4) B12 .....4.30
Williamsport,Pa.(3) S19..4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks(S.R.) L6 ....10.85
McK.Rks.(D.R.) L6 ...14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.05
Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ....4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ...4.10
Detroit(8) M1 .....4.15
Ecorse,Mich. G5 .....4.15
Fairfield,Ala. T2 .....4.05
FairlessHills,Pa. U5 ....4.10
Fontana,Calif. K1 .....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 .....4.25
Ind.Harbor,Ind. I-2, Y1..4.05
Irvin,Pa. U5 .....4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ...4.05
Mansfield,O. E6 (37) ...4.05
Mansfield,O. E6 (38) ...4.80
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 .....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 Ga. & lighter)

Ala.City,Ala. R2 .....5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .....5.80
Youngstown Y1 .....5.80

SHEETS, H.R. (14 Ga. & heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ...6.15
Ecorse,Mich. G5 .....6.20
Fairfield,Ala. T2 .....6.10
FairlessHills,Pa. U5 ....6.15
Fontana,Calif. K1 .....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1..6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 .....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Conshohocken,Pa. A3 ...5.00
Ecorse,Mich. G5 .....5.05
Fairfield,Ala. T2 .....4.95
FairlessHills,Pa. U5 ....5.00
Follansbee,W.Va. F4 ...4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 .....5.15
Ind.Harbor,Ind. I-2, Y1..4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ...4.95
Middletown,O. A10 .....4.95
Newport,Ky. N9 .....4.95
Pittsburg,Calif. C11 ....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 .....4.95
SparrowsPoint,Md. B2 ..4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 .....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.60
FairlessHills,Pa. U5 ....7.55
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1 ..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ....7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 .....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.55
Middletown,O. A10 .....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Ga.)	Cu Alloy	Cu Fe
Ashland,Ky.	A10 6.50	....
Canton,O.	R2 ...6.50	7.10
Fairfield	T2 .....5.70	....
Gary,Ind.	U5 ....5.70	5.95
Ind.Harbor	I-2 ..5.70	5.95
Irvin,Pa.	U5 .....5.70	....
Kokomo,Ind.	C16 5.80	....
MartinsFrry.	O.W10 5.70	....
Newport,Ky.	N9..5.70	5.95
Pitts.,Calif.	C11..6.45	....
SparrowsPt,	B2 ..5.70	....

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....6.75
Gary,Ind. U5 .....5.95
MartinsFerry,O. W10 ...5.95

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Delphos,O. N16 .....6.10‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45†
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 .....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ...6.20*
SparrowsPt.,Md. B2 ...5.45‡
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....6.325

SHEETS, Galvanized
High-Strength Low-Alloy

Irvin,Pa. U5 .....6.20
SparrowsPoint(39) B2 ..6.20

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.85
Irvin,Pa. U5 .....5.85
Kokomo,Ind. C16 .....6.20
Newport,Ky. N9 .....5.85
Niles,O. N12 .....5.85

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ....5.70
Canton,O. R2 .....6.30

SHEETS, Galvanized
Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 .....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 .....6.15

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ...5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 Ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 .....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 .....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....6.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C3 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Frets-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L3 LaSalle Steel Co.
L5 Latrobe Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M15 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City, Ala.(27) R2	4.05
Allenport,Pa. P7	4.05
Alton,Ill. L1	4.225
Ashland,Ky.(8) A10	4.05
Atlanta A11	4.35
Bessemer,Ala. T2	4.05
Birmingham C15	4.05
Bridgeport,Conn. N19	4.35
Buffalo(27) R2	4.05
Conshohocken,Pa. A3	4.10
Detroit M1	4.15
Ecorse,Mich. G5	4.15
Fairfield,Ala. T2	4.05
Fontana,Calif. K1	4.825
Gary,Ind. U5	4.05
Ind.Harbor,Ind. I-2, Y1	4.05
Johnstown,Pa.(25) B2	4.05
Lackaw'na,N.Y.(25) B2	4.05
LosAngeles(25) B3	4.80
Milton,Pa. M18	4.05
Minnequa,Colo. C10	5.15
N.Tonawanda,N.Y. B11	4.05
Pittsburg,Calif. C11	4.80
Portsmouth,O. P12	4.05
Riverdale,Ill. A1	4.05
SanFrancisco S7	5.00
Seattle(25) B3, P23	5.05
Seattle N14	5.05
Sharon,Pa. S3	4.05
So.Chicago,Ill. W14	4.05
So.SanFrancisco(25) B3	4.80
SparrowsPoint,Md. B2	4.05
Sterling(1) N15	4.05
Sterling,Ill. N15	4.15
Torrance,Calif. C11	4.80
Warren,O. R2	4.05
Weirton,W.Va. W6	4.05
Youngstown U5	4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.60
Carnegie,Pa. S18	6.70
Fontana,Calif. K1	8.10
Gary,Ind. U5	6.70
Ind.Harbor,Ind. Y1	6.70
LosAngeles B3	7.90
Newport,Ky. N9	6.70
Seattle P23	7.80
Sharon,Pa. S3	6.70
So.Chicago W14	6.70
Youngstown U5, Y1	6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.15
Conshohocken,Pa. A3	6.15
Ecorse,Mich. G5	6.25
Fairfield,Ala. T2	6.15
Fontana,Calif. K1	7.25
Gary,Ind. U5	6.15
Houston S5	6.40
Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lackawanna,N.Y. B2	6.15
LosAngeles(25) B3	6.90
Seattle(25) B3, P23	7.15
Sharon,Pa. S3	6.15
So.SanFrancisco(25) B3	6.90
SparrowsPoint,Md. B2	6.15
Warren,O. R2	6.15
Weirton,W.Va. W6	6.15
Youngstown U5, Y1	6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.30
Warren,O. R2	4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	5.75
Baltimore T6	5.75
Boston T6	6.30
Cleveland A7, J5	5.75
Conshohocken,Pa. A3	5.80
Dearborn,Mich. D3	5.85
Detroit D2, M1, P20	5.85
Dover,O. G6	5.75
Ecorse,Mich. G5	5.85
Follansbee,W.Va. F4	5.75
Fontana,Calif. K1	7.65
FranklinPark,Ill. T6	5.85
Ind.Harbor,Ind. I-2	5.85
Ind.Harbor,Ind. Y1	5.75
Indianapolis C5	5.90
LosAngeles C1	7.80
Middletown,O. A10	5.75
NewBedford,Mass. R10	6.20
NewBritain(10) S15	5.75
NewCastle,Pa. B4, E5	5.75
NewHaven,Conn. A7	6.50
NewHaven,Conn. D3	6.20
NewKensington,Pa. A6	5.75
Pawtucket,R.I. R3	6.40
Pawtucket,R.I. N8	6.30
Pittsburgh J5	5.75
Portsmouth,O. P12	5.75
Riverdale,Ill. A1	5.85
Rome,N.Y.(22) R6	5.75
Sharon,Pa. S3	5.75
SparrowsPt.,Md. B2	5.75
Trenton,N.J.(31) R5	7.30
Wallingford,Conn. W2	6.30
Warren,O. B9, R2, T5	5.75
Weirton,W.Va. W6	5.75
Worcester,Mass. A7	6.60
Youngstown C8, Y1	5.75

STRIP, Cold-Rolled Alloy

Boston T6	12.80
Carnegie,Pa. S18	12.45
Cleveland A7	12.45
Dover,O. G6	12.45
Fontana,Calif. K1	14.55
FranklinPark,Ill. T6	12.45
Harrison,N.J. C18	12.45
Pawtucket,R.I. N8	12.80
Sharon,Pa. S3	12.45
Worcester,Mass. A7	12.75
Youngstown C8	12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5	5.80
Dearborn,Mich. D3	5.70
Dover,O. G6	5.80
Ecorse,Mich. G5	5.70
Ind.Harbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	5.425

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Boston T6	6.20	8.35	9.30	11.45	14.15
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.85	8.25	9.20	....	....
Detroit D2	5.85	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
NewBritain,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
NewKensington,Pa. A6	5.75	8.05	9.00	11.15	....
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill. A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
FranklinPark,Ill. T6	...	...	13.40	16.10	19.50
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. A7, T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.35	15.95	19.35

Pittsburgh J5	8.60
Sharon,Pa. S3	8.60
SparrowsPoint,Md. B2	8.425
Warren,O. R2	8.60
Weirton,W.Va. W6	8.60
Youngstown Y1	8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	6.35

STRIP, Electrogalvanized

Cleveland A7	5.75*
Dover,O. G6	5.75*
Riverdale,Ill. A1	5.85*
Youngstown C8	5.75*
Warren,O. B9, T5	5.75*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	6.60*

*Plus galvanizing extras.

Strip, Galvanized (Continuous)

Sharon,Pa. S3	6.15
Warren,O. B9	6.15

TIGHT COOPERAGE HOOP

Atlanta A11	4.775
Riverdale,Ill. A1	4.625
Sharon,Pa. S3	4.475
Youngstown U5	4.475

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	9.10	10.10	11.00
Brackenridge,Pa. A4	....	....	9.10	10.10	11.00
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*8.95*		9.55*10.55*		....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*8.75*		9.35*10.35*		11.25*
Warren,O. R2	8.225‡	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.90‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. ‖ Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TINPLATE,American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Irwin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg Calif. C11	7.35
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Follansbee,W.Va. F4	6.20
Gary,Ind. U5	6.20
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.20
Irvin,Pa. U5	6.20
Yorkville,O. W10	6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	5.925
Atlanta A11	5.95
Bartonville,Ill. K4	5.85
Buffalo W12	5.75
Chicago W13	5.75
Cleveland A7, C20	5.75
Crawfordsville,Ind. M8	5.85
Donora,Pa. A7	5.75
Duluth,Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.95
Houston S5	6.00
Jacksonville,Fla. M8	6.27
Johnstown,Pa. B2	5.75
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	6.00
Kokomo,Ind. C16	5.85
LosAngeles B3	6.70
Minnequa,Colo. C10	6.00
Monessen,Pa. P7	5.75
Newark 6-8 ga. I-1	6.40
No.Tonawanda B11	5.75
Palmer,Mass. W12	6.05
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	5.75
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C10	6.70
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Sterling,Ill. N15	5.85
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.375
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	7.20
Johnstown,Pa. B2	7.20
LosAngeles B3	8.15
Milbury,Mass.(12) N6	7.50
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
Muncie,Ind. I-7	7.40
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Roebling,N.J. R5	7.50
So.Chicago,Ill. R2	7.20
So.SanFrancisco C10	8.15
SparrowsPt.,Md. B2	7.20
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester A7,J4,T6,W13	7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.90
Alton,Ill. L1	7.075
Buffalo W12	6.90
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
KansasCity,Mo. S5	7.50
LosAngeles B3	7.85
Minnequa,Colo. C10	7.075
Monessen,Pa. P7, P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	7.20
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	6.90
Roebling,N.J. R5	7.20
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Struthers,O. Y1	6.90
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	11.375
Bartonville,Ill. K4	11.30
Buffalo W12	11.20
Chicago W13	11.20
Cleveland A7	11.20
Crawfordsville,Ind. M8	11.30
Fostoria,O. S1	11.20
Jacksonville,Fla. M8	11.73
Johnstown,Pa. B2	11.20
Kokomo,Ind. C16	11.20
Minnequa,Colo. C10	10.95
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	11.40
Palmer,Mass. W12	11.50
Roebling,N.J. R5	11.50
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7,T6	11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.90
Buffalo W12	9.90
Johnstown,Pa. B2	9.90
Minnequa,Colo. C10	10.025
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	10.10
Portsmouth,O. P12	9.90
Roebling,N.J. R5	10.20
SparrowsPt.,Md. B2	10.00

ROPE WIRE	(A)
Alton,Ill. L1	9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.75
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
SparrowsPt. B2	9.85
Struthers,O. Y1	9.75
Worcester J4, T6	9.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Alton,Ill. L1	13.25
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. O6	7.95
Fostoria,O. S1	7.95
FranklinPark,Ill. T6	8.05
Kokomo,Ind. C16	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

	16 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	6.90	7.30**
Aliquippa J5	6.90	7.425‡
Atlanta A11	7.00	7.55
Bartonville(48) K4	7.00	7.55
Buffalo W12	6.90	7.30†
Cleveland A7	6.90	....
Crawfordsville M8	7.00	7.55
Donora,Pa. A7	6.90	7.30†
Duluth,Minn. A7	6.90	7.30†
Fairfield T2	6.90	7.30†
Houston,Tex. S5	7.15	7.55†
Jacks'ville,Fla. M8	7.425	7.95
JohnstownB2(48)	6.90	7.45*
Joliet,Ill. A7	6.90	7.30†
KansasCity,Mo. S5	7.15	7.55†
Kokomo C16	7.00	7.40†
LosAngeles B3	7.85	....
Minnequa C10	7.15	7.55**
Monessen P7 (48)	6.90	7.45
Palmer,Mass. W12	7.20	7.60†
Pitts.,Calif. C11	7.85	8.25†
Portsmouth,O. P12	6.90	....
Rankin A7	6.90	7.30†
So.Chicago R2	6.90	7.30**
So.S.Fran. C10	7.85	8.25**
SparrwsPt.B2(48)	7.00	7.55*
Sterling(1)(48)N15	6.90	7.45
Struthers,O.(48)Y1	6.90	7.40‡
Worcester,Mass.A7	7.20	....

*Based on 11c zinc; †5c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN Fence, 9-15½ Ga.

	Col.
Ala.City,Ala. R2	148**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Allq'ppa,Pa.9-14½ga.J5	149§
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	151†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	151†
Kokomo,Ind. C16	145†
Minnequa,Colo. C10	151**
Monessen,Pa. 9 ga. P17	149
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

†Based on 8e zinc; *11c zinc; ‡10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R3	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	160
KansasCity,Mo. S5	160
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	158**
Aliquippa J5	156‡
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	164†
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	164†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	164**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	158**
So.SanFrancisco C10	179**
SparrowsPoint,Md. B2	161*
Sterling,Ill.(1) N15	162

†Based on 8e zinc; *11c zinc; ‡10c zinc; **Subject to zinc equalization extras.

WIRE (16 Gage)	An'ld Galv. Stone	Galv. Stone
Ala.City R2	13.15	14.70**
Bartonville K4	13.25	15.10
Buffalo W12	13.15	....
Cleveland A7	13.15	....
Crawfordsville M8	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	14.80†
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70†
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	....

*Based on 11c zinc; †5c zinc; ‡10c zinc; **Subject to zinc equalization extras.

NAILS, Stock
To Dealers & Mfrs. (7)

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	155
Houston,Tex. S5	142
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	142
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$5.30
Wheeling,W.Va. W10	5.30

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	139
Atlanta A11	140
Bartonville,Ill. K4	139
Crawfordsville,Ind. M8	139
Donora,Pa. A7	139
Duluth,Minn. A7	139
Fairfield,Ala. T2	139
Johnstown,Pa. B2	139
Joliet,Ill. A7	139
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	157
Rankin,Pa. A7	139
SparrowsPt.,Md. B2	140
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	156
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	150
Marion,O. P11	150
Minnequa,Colo. C10	155
Moline,Ill. R2	155
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

1 in. and shorter:	
½-in. & smaller diam	2
Over 1 in. through 6 in.:	
½ in. & smaller diam	+3
6 in. and shorter:	
⅝-in. and ⅝-in.	+4
¾ in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoe	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex. regular & heavy:	
⅝" and smaller	55
⅞" to 1¼", inclusive	58
1⅜" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
⅝" or smaller	38
⅞" to 1½", inclusive	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam x 6 in. and shorter	34
1 in. and smaller diam x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	31
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼ in. through ⅝-in.	38
⅝-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
⅝-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in. larger 9.25
⅞-in. under..List less 37½

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

OD In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.09
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1⅝	13	25.28	30.31	24.52
2	13	23.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.52	33.59
2⅝	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	All No. 2	Too Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. U5	4.45	4.35	4.40	...
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...	(16)5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.85
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S10	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh G3, P14	11.50
Seattle B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B2	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+ % Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.i.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ¼ in. x 1.3 in.	21.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	32.50
Unannealed (99+ % Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl iron:	
97.9-99.8% size 5 to 10 microns—$3.00-14.00	
Aluminum:	
Atomized, 500 lb drums, frght. allowed:	
Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	31.25-39.75†
Bronze, 5000-lb lots	51.50-54.75†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	97.00
Nickel-Silver, 5000-lb lots	47.50-51.00
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	$1.25
Tin	14.50*
Zinc, 5000-lb lots 17.25-31.00‡	
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 5 cols. lower.
(8) 18 Ga. and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.85c.
(15) ⅝" and thinner.
(16) 40 lb and under
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 26" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.25c H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.00c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2	2½	3	3½	4	5	6
List Per Ft	37c	55.5c	76.5c	92c	$1.09	$1.48	$1.92
Pounds Per Ft	3.68	5.82	7.62	9.20	10.89	14.81	19.18

	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	..	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛	¼	⅜	½	¾	1	1¼
List Per Ft	5.5c	8c	11c	8.5c	11.5c	17c	23c
Pounds Per Ft	0.24	0.42	0.57	0.85	1.13	1.68	2.28

	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+8.5	9.5	+15	....	..	....	....	....	..	....	....
Etna, Pa. N2	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless Hills, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	....	..	....	....	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½	2	2½	3	3½	4
List Per Ft	27.5c	37c	55.5c	76.5c	92c	$1.09
Pounds Per Ft	2.73	3.68	5.82	7.62	9.20	10.89

	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	33.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless Hills, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.75	21.00	30.00	34.75	30.25	35.75	37.75	41.75	38.75
302	17.75	23.25	30.25	35.00	32.50	36.00	38.00	42.00	42.00
302B	19.00	25.00	31.00	35.00	35.50	36.00	38.00	45.25	45.25
303	....	25.25	32.75	37.75	....	38.75	40.25	46.00	46.00
304	19.00	24.50	31.75	36.75	35.00	38.00	40.50	44.50	44.50
304L	....	....	36.75	41.75	40.00	43.00	45.50	49.50	49.50
305	20.50	26.50	33.50	37.25	38.00	38.00	41.00	47.50	47.50
308	20.75	27.25	36.25	41.75	39.00	43.00	47.00	49.00	49.00
309	27.75	36.00	44.00	50.00	50.50	51.75	55.00	63.25	63.25
309S	29.75	38.75	48.00	55.75	55.25	56.75	60.25	69.75	69.75
310	35.00	45.25	58.75	68.25	64.75	69.50	71.00	74.25	74.25
314	....	....	....	....	....	....	71.00	....	....
316	29.75	38.00	48.25	56.25	53.00	57.25	60.50	64.50	64.50
316L	....	....	53.25	61.25	60.00	62.25	65.50	69.50	69.50
317	35.00	45.50	59.25	68.75	69.50	70.25	72.75	79.00	79.00
321	23.50	30.25	36.00	41.50	41.75	42.75	46.50	51.25	51.25
330	....	....	61.50	....	....	72.00	73.25	81.25	81.25
18-8CbTa	29.25	38.25	46.00	52.25	53.00	53.75	58.50	66.50	66.50
403	....	....	27.00	30.75	....	32.00	34.25	....	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.25	26.25	28.75	30.00	34.25	34.25
414	....	....	24.50	....	....	29.25	30.50	35.25	35.25
416	....	....	24.50	26.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	26.25	27.00	29.25	30.50	34.75	34.75
430F	....	....	25.00	28.75	....	29.75	....	....	....
431	15.00	19.25	25.00	26.75	26.00	29.75	....	35.75	35.75
446	....	....	33.50	36.25	50.25	39.50	40.75	59.75	59.75

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	28.00
304	28.30	33.60	29.75
304-L	30.30	35.50	....
310	41.30	47.00	....
316	33.40	38.80	42.75
316-L	37.80	43.30	....
316-CB	38.90	45.50	....
321	30.00	35.30	34.25
347	32.20	38.60	44.25
405	23.90	31.10	....
410	23.40	30.60	....
430	23.40	30.60	24.25
Inconel	47.90	63.90	....
Nickel	39.50	54.10	....
Monel	40.80	54.80	....
L-Nickel	41.70	58.50	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	29.60	37.15	25.75	33.55

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.909

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden,Ala. R2	52.38	52.88	....	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo H1, R2	56.00	56.50	57.00	57.50
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester,N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee,deld.	58.17	58.67	58.67	59.17
Muskegon,Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7, R2	56.00	56.50	56.50	57.00
Akron,O. deld.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. R2	58.00	58.50	59.00	59.50
NewYork, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.53
Birdsboro,Pa. B10	58.00	58.50	....	....
Chester,Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKeesRocks, deld.	....	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	58.16	58.16	58.66
Verona, Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U8	56.00	....	56.50	57.00
Clairton,Rankin,SoDuquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U8	56.00	....	....	57.00
Mansfield,O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. M1	60.50	61.00	61.50	....
Fontana,Calif. K4	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	53.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos, 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$80.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2	85.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	88.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland A7 (Intermediate)	$61.00
Lyles,Tenn. T3	70.00
Rockwood,Tenn. T2	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.55
Troy,N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302‡‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.62	7.51	7.79	....	6.69	...	6.68	8.52[6]	12.54	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25[2]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	45.28[8]	7.47	...	7.20	8.60	12.30	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.00	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	46.05	6.62	...	6.51	7.25	11.75	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	46.10	6.86	...	6.75	7.55	12.00	6.86	6.81	7.80
Cleveland	6.38	7.38	8.25	46.16	6.72	...	6.57	7.35	11.81	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.54	11.95	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.50	9.35	9.95	50.15	7.85	11.75	7.45	10.15	13.15	7.65	7.45	9.55
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.44	11.54	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.60	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.95	7.56	...	7.37	8.73[8]	12.13	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98[8]	6.96	8.80	6.74	7.86[8]	11.96	6.54	6.49	7.51[10]
Pittsburgh	6.38	7.38	8.30	46.00	6.72	...	6.51	7.85	11.75	6.69	6.52	7.64
Portland, Oreg.	7.00	7.75	8.90	48.50	7.25	...	7.05	10.20	14.00	7.00	6.85	8.75
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.64[8]	12.04	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.01	....	7.35	7.18	8.30
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.05	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	51.00	8.20	...	7.80	10.95	13.50	7.75	7.80	9.60
Spokane	8.35	9.65[7]	10.05	....	7.80	...	7.80	10.85‡‡	14.25	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, Cleveland, Pittsburgh, San Francisco (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; °°¼-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

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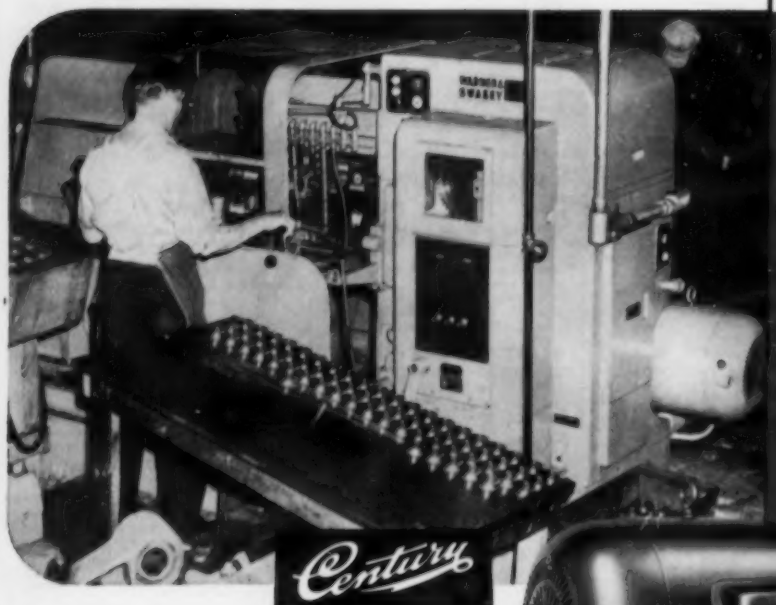

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Peer Beyond the Purchase Price

Steel buyers urged by Warehouse association to analyze purchase cost of "steel ready for use" in developing policy directed toward realistic cost reduction program

ALL INDUSTRY is cost conscious in these days of intensive competition for the favor of the consumer. No industrial segment of the economy is more sensitive to the need than metalworking.

Cost reduction is seen as the "open sesame" to improved profits, a stronger competitive position, better values to customers and waste elimination. As basic objectives of every well managed business, all are closely interrelated in the over-all management problem.

High production and distribution costs, generally, can be traced to: 1. Outmoded production and marketing methods. 2. Obsolete facilities. 3. Outdated competitive practices. 4. Wasteful buying habits.

Fruitful Area—The factors are not necessarily listed in their order of importance. Each requires separate treatment in management's approach to the problem presented. But wasteful buying habits probably provide the most fruitful area for immediate effective cost-cutting action. Material expenses average something like 55 cents of every sales dollar.

It is in the latter area that the American Steel Warehouse Association currently is directing an educational campaign addressed to steel consumers.

Calling attention to "steel's hidden cost," represented by unnecessary and burdensome manufacturing plant inventories, the association is pointing out that the rising "cost of possession" makes review of purchasing practices imperative. Such study would seem especially pertinent today in the face of reported "scare" buying of steel for inventory by consumers who fear shortages ahead.

Potential Recognized — What the association suggests (greater use of established warehouse service in lieu of excessive plant inventories) is not essentially new. Steel warehousing has experienced sharp growth over the past quarter century—about twice that of the basic steel industry (400 against 200 per cent) from the standpoint of finished steel tonnage handled. The suggestion is that steel consumers long since have become conscious of the inherent cost-saving potentialities in warehouse distribution of steel. With the "cost of possession" rising steadily, the "cost ready to use" is boosted above the level at which steel can be purchased from the distributors. Increasing dependence on the warehouses as steel supply sources seems to be in the cards.

Direct mill purchasing of steel in large quantities always has, and still does, offer economies to consumers for production line purposes. But when a wide variety of items is inventoried to take advantage of mill quantity prices, the Warehouse association holds that low mill prices may not be the lowest cost possible by the time the steel is ready for use. When purchases are made for stocks, buyers are paying "hidden inventory costs" which must be added to the purchase price, it says. Consumers are urged to figure their steel costs as follows: Purchase price + cost of possession = "cost ready to use."

Hidden Costs—The "cost of possession" (see check list) has risen so greatly that in most instances economies once possible in investing in inventories can no longer be realized, according to the association. But the hidden costs in steel stocks can be eliminated, or at least greatly minimized, by depending upon the established warehouses as supply sources.

These distributors, over the years, have expanded and improved their services tremendously through installation of cost-saving equipment and modern facilities. As a result, warehouse costs are down, with attending lower distributing charges. At the same time, modern cutting, sawing, slitting and burning equipment enables distributors to offer steel cut to exact size and in desired quantities for immediate shipment. The necessity is obviated for many consumers to maintain large plant stocks and the requisite storage space and equipment. Similar service is not available at the mill level.

Offers Broad Service—Today, the steel warehouse industry offers manufacturers a service which, in effect, anticipates the combined inventory requirements of many consumers, thus reducing wastage, scrap losses, product obsolescence and errors in planning. Further, warehouse service makes for broader product availability to consumers, smaller cash investment in supplies, lower handling and storage costs, less capital investment in handling and cutting equipment. Inventory losses attending reductions in prices are reduced to a minimum.

If consumers will "peer past the purchase price" and analyze their steel costs realistically, the Warehouse association feels certain the natural resistance to change in long established buying policy, so common among buyers, will be successfully overcome in the matter of steel procurement. The result: A substantial reduction in manufacturing industry's over-all steel costs.

Tin Plate . . .

Tin Plate Prices, Page 170

Shipments of metal cans in January totaled 279,614 tons, off about 1 per cent from the December total of 283,386 tons. A year ago these shipments amounted to 264,751 tons.

COST OF POSSESSION

- Cost of capital invested in inventories
- Cost of scrap and wastage
- Cost of obsolescence
- Cost of labor for handling
- Cost of insurance, taxes and accounting
- Cost of space for storage
- Charges on capital invested in storage, handling and cutting equipment
- Cost of price reduction

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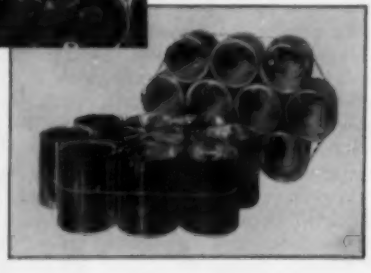

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Sheets, Strip . . .

Sheet & Strip Prices, Pages 160 & 170

Sheetmakers continue to feel that demand for their product will lose some of its steam by midyear, but so far there is little or no lag in buying. Some mills think consumers are seeking tonnage beyond actual manufacturing requirements, figuring they can't possibly lose by even a substantial expansion in inventories. A wage increase would most certainly result in higher priced steel.

There is every likelihood of a drop in automotive buying in late second quarter, whether or not there is a strike of autoworkers. Nevertheless, producers of cold-rolled sheets are still being offered more business than they can handle for second quarter. Some producers are virtually out of the market for the period and are suggesting hot-rolled pickled sheets for May and June shipment in lieu of cold-rolled. Galvanized sheet promises continue well extended, especially on continuous hot-dipped. The third quarter is the best delivery some makers can give.

Stainless Steel . . .

Stainless Steel Prices, Page 172

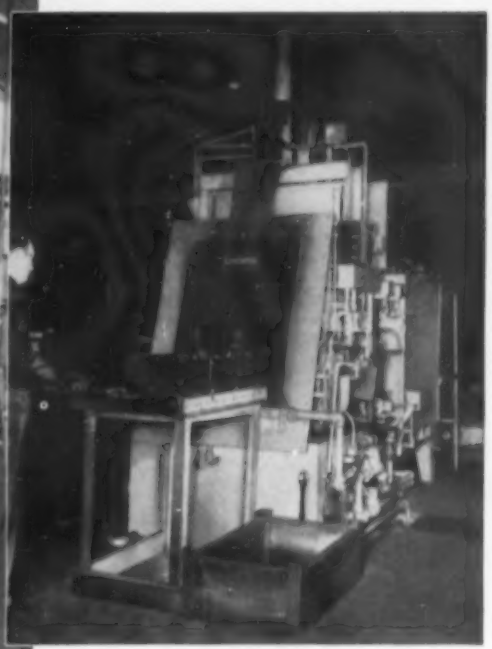
Improvement in stainless steel sales, especially flat-rolled, will continue in the second quarter. E. J. Hanley, president, Allegheny Ludlum Steel Corp., Pittsburgh says: "Stainless flat-rolled production facilities have operated near capacity levels since November, 1954, and the demand continues strong."

Steel Bars . . .

Bar Prices, Page 168

Hot-rolled carbon bar deliveries continue to lengthen. Consumers are finding first rollings increasingly difficult to obtain. Where they can't get tonnage into early rolling schedules, they usually have to wait four to seven weeks. Cold-drawers have less material to offer from stock; also, they have less hot stock on hand for processing. Consequently, cold-finished deliveries are becoming much more extended.

Automotive requirements continue dominant, but appliance and warehouse needs are growing. Most of the increase in demand is attributable to civilian demands, no significant changes in defense orders being noted. In the main, buyers are having more difficulty obtaining flats than rounds. Foreign bars have practically ceased as a competitive item in the market.



Left: New England Metallurgical Corporation installed first Lindberg Carbo-nitriding Furnace at Worcester plant.

Above: Six months later New England Metallurgical installed second Carbo-nitriding Furnace at Boston pant.

One *LINDBERG* Carbo-nitriding Furnace merited another at New England Metallurgical Corporation

"Our first Lindberg Carbo-nitriding furnace in January . . our second one installed just 6 months later!" Yes, that's what happened in the plants of New England Metallurgical Corp., Boston, Mass., for more than 28 years well known commercial heat treaters.

The first unit, a gas fired, radiant tube, carbo-nitriding furnace went to the company's Worcester plant known as Greenman Steel Treating Company.

Six months later a second Lindberg Carbo-nitriding furnace was installed in the Boston plant of New England Metallurgical Corporation . . and this team of versatile "work horses" have been continually turning out production . . 24 hours a day.

Mr. Lloyd Field, Vice-President and General Manager of the Worcester Division, has this to say about the Lindberg Carbo-nitriding Furnaces: "We selected Lindberg Carbo-nitriding Equipment for the usual reasons . . cost cutting . . uniform, quality work . . high, dependable production. But more than that . . as you know, variety seems to be the spice of a commercial heat treater's life, and because of the versatility of the Lindberg Carbo-nitriders, which are actually five furnaces in one, they are without doubt our busiest and most valuable pieces of equipment.

"When customers send in work for carbo-nitriding, carburizing, neutral hardening, annealing, or carbon restoration, a hue and cry goes up to check for room on the heavy schedules of the Lindberg Carbo-nitriding Furnaces."

Lindberg Carbo-nitriding Furnaces can do a job for you, too. Ask for bulletin No. 241.

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Lindberg Engineering Company • 2441 Hubbard Street • Chicago 12, Illinois

Visit Lindberg at ASTE Show, Booth No. 666 and at ASM Western Metal Exposition, Booth 334.

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Two Vancoram Manganese Products for Superior Steel and Iron:

Silicomanganese Alloys
Ferromanganese Briquettes

These two versatile Manganese alloys, members of the Vancoram family of products, were each carefully developed to help steel and iron makers produce metals of the highest quality with maximum efficiency.

VANCORAM SILICOMANGANESE ALLOYS, available in three grades, are valuable additions to both steel and cast iron . . . serving as a furnace block, deoxidizer, desulphurizer and source of manganese. These alloys are noted for their purity and uniformity of composition.

Carbon	Manganese	Silicon
1.50% max	65/68%	18/20%
2.00% max	65/68%	15/17.5%
3.00% max	65/68%	12/14.5%

VANCORAM FERROMANGANESE BRIQUETTES are recommended for use in iron as a manganese addition agent and also as a desulphurizer. Their shape is oblong for swift identification, their weight is approximately 3 pounds per briquette for easy handling, and their manganese content is exactly 2 pounds for simple addition without weighing.

The Briquettes are furnished in convenient palletized form, if required, thus simplifying handling and storage and reducing contamination.

Whether you make your additions to furnace, cupola or ladle . . . you'll consistently get better, more uniform results when you use Vancoram Silicomanganese Alloys or Vancoram Ferromanganese Briquettes.

Plates . . .

Plate Prices, Page 168

Platemakers anticipate a small improvement in railroad requirements in late second quarter. Meanwhile, line pipe and miscellaneous fabrication are taking increasing plate tonnage. Construction firms report mill deliveries are lengthening. Some consumers are finding it necessary to fill their prompt needs at warehouses.

Eastern plate mills are beginning to get caught up with those in other areas. Business is accelerating and deliveries on sheared plate are anywhere from late April to well into June. Some strip plate can be had within four to five weeks. The improvement reflects line pipe requirements and more export business. At the same time, consumers are building up inventories.

Tool Steel . . .

Tool Steel Prices, Page 172

Prices have been reduced up to 19 per cent on standard, rough-cored header die hubs, and up to 25 per cent on standard brazed-type stocked mandrel nibs, by the Carboloy Department, General Electric Co., Detroit. The decreases apply only to the larger size standard die nibs, 1 in. and over in diameter and 1⅝-in. and over in length. On the mandrel nibs, the reductions apply only to stocked nibs in sizes over 0.550 in. in diameter. Price reductions reflect greater volume production resulting from increasing demand.

Structural Shapes . . .

Structural Shape Prices, Page 168

Reflecting seasonal influences, structural steel demand is rising. Fabricators are having little difficulty obtaining standard shapes from the mills in four to five weeks, but delivery promises on wide flange sections are more extended.

Firm prices for wide flange and standard shapes are not reflected in quotations for fabricated and erected steel in New England. By shopping around, buyers for bridgework are able to break original estimates. More shops, however, appear reluctant to revise bids to meet competition.

Demand for structurals is heavy in all areas, a Pittsburgh producer reports. Inventories appear down to the point consumers must cover needs promptly. In the East, though, fabricators report awards relatively light and not up to levels reported in some other districts. Absence of important bridge work is being felt.

Merritt, Chapman & Scott Corp. is

LOOK TO DETREX FOR Service WITH A Saving

Value Sign
IN SOLVENT DEGREASING

There are three basic reasons why you get more value in Detrex equipment.

First, no other company can match Detrex experience in solvent degreasing . . . in fact a Detrex development (the art of stabilizing chlorinated solvents) originally made possible modern solvent degreasing. Today, Detrex produces more equipment for use with chlorinated solvents than any other company.

Second, Detrex is the only manufacturer of degreasing equipment who is also a basic producer of solvent . . . industry's *largest* direct supplier of trichlorethylene. Thus, Detrex engineers, chemists, field technicians alike fully understand both the behavior of solvent as well as the operation of the equipment in which it is used.

Third, Detrex service does not stop with installation of equipment but continues, free of charge, for as long as the operation exists. A large, competent staff of Detrex technicians is dedicated to this important work.

All in all, you can't match the benefits that accrue to Detrex customers. And that is the reason why industry prefers equipment that bears the name Detrex . . . it is truly the value sign in solvent degreasing.

We'd like to have your field technician show us ways to cut costs, boost quality in our present degreasing operations. (There is no charge for this service, regardless of your present make of equipment.)

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COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

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Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season; gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot) nom.	*18.00-20.00*
Brazilian iron ore, 68-69% (spot)	*24.00-26.00*

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$25.00-$26.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 85c-87c per long ton unit c.i.f. U. S. ports, duty for buyer's account, 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of lb content, c.i.f. seaboard

50-60%	$3.25-$3.80
65%	4.15-4.25

Vanadium Ore

Cents per lb, V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130; Woodbridge, N. J., $114.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Perla, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¾-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, Ind., ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5¼	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25

CARBON

8	60	11.40
14, 12, 10	60	11.10
14	72	10.25
17	60	10.25
17	72	9.85
20	84	9.85
20	90	9.65
24	72, 84	9.85
24	96	9.60
30	84	9.75
40, 35	110	9.50
40	100	9.50

the apparent low bidder on the major section of the tunnel under Baltimore harbor. Its bid was $29,894,-081. The tunnel requires construction of twin tubes 1.7 miles long.

Phoenix Iron & Steel Co., Phoenixville, Pa., advanced standard structural shapes to 4.20c, mill, up $5 per ton, effective Mar. 15. The new price compares with 4.30c, Bethlehem and Johnstown, Pa., and 4.25c, Clairton, Pa.

Tubular Goods . . .

Tubular Goods Prices, Page 172

An increase in sales of tubular goods used in construction projects is noted by Pittsburgh district pipemakers. This seasonal improvement is expected to accelerate with construction requirements which figure to be unusually heavy over the coming months. Seamless oil country pipe continues to move briskly.

Cast iron pipe distributors in the Pacific Northwest report continued activity as new projects come out for figures. Considerable tonnage is pending in the area.

Fluorspar . . .

Fluorspar Prices, Page 180

Mercantile Metal & Ore Corp., 595 Madison avenue, New York, has been appointed exclusive sales agent for the fluorspar output of Las Cuevas mine. Said to be the largest producer of metallurgical fluorspar in Mexico, the mine being operated at about 3000 tons monthly. Mechanization and exploration activities are being stepped-up. Arrangements were made through Rafael Miner, who holds controlling interest in the mine.

Wire . . .

Wire Prices, Pages 170 & 171

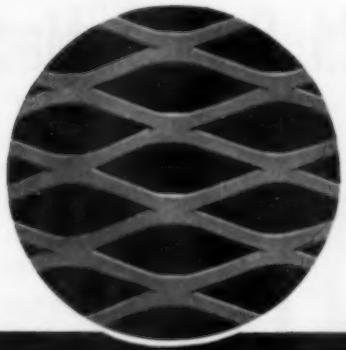
Prospects for merchant wire products are bright. In the Chicago area, producers report it looks like a good crop year. Farmers are in a position to order their needs for fencing, netting, baling wire, etc. Warehouses hold good inventories, however, and are reluctant to expand them, even though shortages or slow mill deliveries may develop soon.

Warehouse . . .

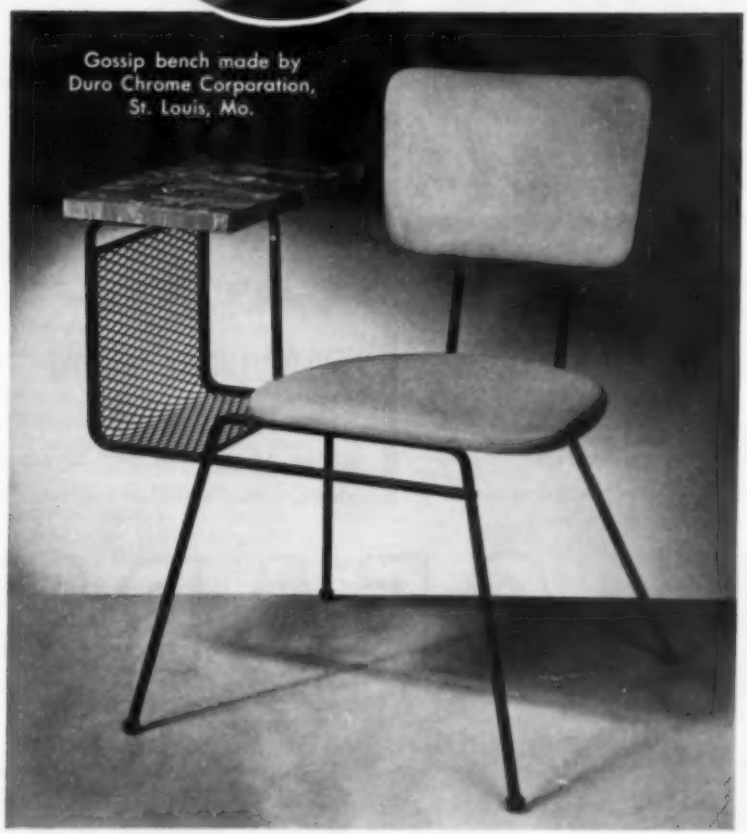
Warehouse Prices, Page 173

Effects of near-capacity mill operations are felt only indirectly by warehouses. While the order volume of distributors is up, the gain in tonnage has not kept pace with that at mill level. Spot orders are being received from consumers, notably for

(*Please turn to page* 183)



← Puts SALES APPEAL in your product



Gossip bench made by
Duro Chrome Corporation,
St. Louis, Mo.

No matter what you make, chances are PENMETAL EXPANDED METAL can help you make it better.

Decorative . . . it gives your product a clean, modern look that will step up your sales. Functional . . . the diamond truss pattern adds rigidity and strength besides permitting the free passage of sound, light and air.

Penmetal expanded metal is sheet metal, slit and expanded to as much as ten times its original width. It is up to 80% lighter than solid sheet of the same dimensions. Comes in corrosion-resistant metals and carbon steel; large or small mesh; light or heavy gauge. Easily formed, shaped and welded.

Send for 28-page catalog giving mesh sizes, weights and dimensions, and showing many profitable ways to use this versatile material. No cost or obligation.

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Plant: Parkersburg, W. Va.

Railroad car air filter,
a product of
Farr Company, Los Angeles, Cal.

Television set by
Muntz Television, Inc.,
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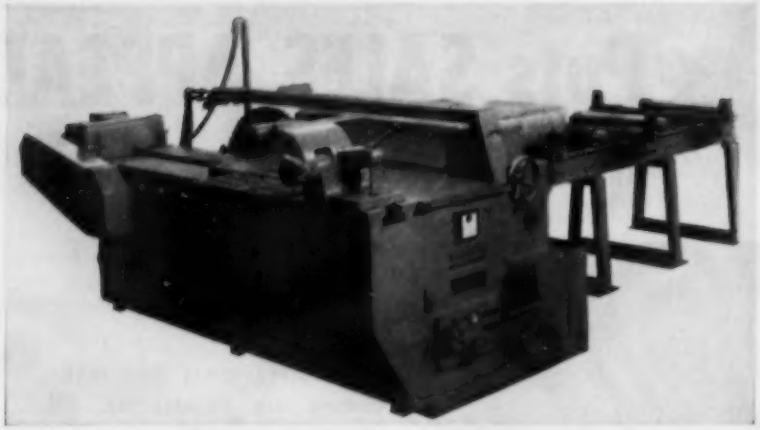
Penmetal
REG. U.S. PAT. OFF.
1849
OF QUALITY

PM-57

NEW Hydraulic Nonferrous Cold Sawing Machine



Picture shows Model WKLM1000, high speed, long stroke, cold circular saw. This machine is for cutting nonferrous cakes up to 12 by 60 inches. Other nonferrous models are available for cutting billets, wire bars, slabs and other structural shapes. The machines are equipped with main drive up to 60 H.P. and are supplied in five speed ranges.

As the exclusive U.S. distributor for the Gustav Wagner Machine Tool Works of Reutlingen, Germany, we offer WAGNER Hydraulic Cold Sawing Machines, Saw Blades, Automatic Saw Sharpening Machines and related equipment. We have more than 20 years experience in the field of cold sawing metals; your inquiries will be given prompt and competent attention.

The most complete line of Cold Sawing Machines available

KLINGELHOFER MACHINE TOOL COMPANY

SERVING INDUSTRY FOR OVER 25 YEARS

Industrial Park, Kenilworth, New Jersey

MAKE HARDNESS TESTS ANYWHERE

NOW make "on the spot" Rockwell tests with Riehle Portable Hardness Testers. Riehle portables test inside and outside surfaces of parts inaccessible or difficult to test on bench machines. Riehle testers weigh but a few pounds and come in handy carrying cases. They save the expense and time of cutting samples from heavy parts. Riehle Portable Hardness Testers eliminate conversion errors by using standard diamond indentors with standard Rockwell loadings. Scales: A, B, C, D, F and G. For specimens up to 12" diameter or thickness.

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RIEHLE **TESTING MACHINES**

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GEARS

of every description— made to your specifications

GEARS
RACKS
SPROCKETS
We've got the men and the machines to handle your special requirements in Gears, Racks and Sprockets. Write, wire or phone for prompt quotation.

E. B. SEWALL Manufacturing Company—PRior 7721

694 Glendale Street, St. Paul 14, Minnesota

SEWALL

(*Concluded from page* 180)

sheets. This business is unrelated to normal warehouse volume. Low inventories of some consumers is being reflected in a little more spot demand now that rolling mill deliveries are extended. March business is expected to be the best so far this year. Good second quarter volume is seen.

In the East, the warehouses have set up new quantity extras on cold-finished bars in less than 300 lb lots: $7 in quantities from 150 to 300 lb; $12 from 75 to 149 lb, and $17 under 75 lb.

Steel Output Tops Last Year's

Production of ingots and steel for castings totaled 8,503,000 net tons in February, reports the American Iron & Steel Institute. This compares with 8,837,736 tons in January and 7,083,237 in February, 1954. At the same time, the index of steel output for the month (based on 1947-49 as 100) was 132.3, the highest since October, 1953.

Because of February's fewer days, production was 335,000 tons under that of the preceding month. However, it was 1.4 million tons above February a year ago.

The index of production rose from 124.2 in January. A year ago it was 110.2 and for the full year 1954 it averaged 105.4.

Production in February was at 88.1 per cent of the new industry capacity, now rated at 125,828,310 tons. The January output was at 82.7 per cent of capacity. In February last year the figure was 74.3 per cent of the 1954 capacity which was rated at 124.3 million tons.

Output during the first two months of this year totaled 17,340,736 tons, compared with 15,034,723 in the like period of 1954.

Prices Unchanged

FERROALLOY prices remain unchanged. Current price schedules on these products were published in full on page 176 in the Mar. 7 issue of STEEL.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2930 tons, parking garage, store and office, Camden, N. J., through Terminal Construction Corp., to Bethlehem Steel Co., Bethlehem, Pa.

2800 tons, shopping center, Roosevelt Field, Long Island, through Webb & Knapp Inc., New York, to Bethlehem Steel Co., Bethlehem, Pa.

2240 tons, City School of Printing, New York, through Peaty & Fuhrman, that city, to Lehigh Structural Steel Co., Allentown, Pa.

1890 tons, 24-story office building, 415 Madison Ave., New York, through Emery Roth & Sons, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

1820 tons, State Civil Service & Commerce building, Albany, N. Y., through Brown-Turner Inc., New York, to Bethlehem Steel Co., Bethlehem, Pa.

1505 tons, dormitory, Rutgers University, New Brunswick, N. J., through Paul Tishman Inc., to Elizabeth Iron Works, Elizabeth, N. J.

1060 tons, laboratory and cafeteria building, Parma, O., for National Carbon Division, Union Carbide & Carbon Corp., New York, to Bethlehem Steel Co., Bethlehem, Pa.

935 tons, building for Ethicon Sutures, a Johnson & Johnson subsidiary, Bridgewater township, N. J., through John W. Ryan Construction Co., to Bethlehem Fabricators, Bethlehem, Pa.

815 tons, state thruway bridgework, Westchester county, New York, through the Yonkers Contracting Co., to the Pine Brook Iron & Steel Co., Scranton, Pa.

780 tons, state bridge work, section 36-E, Carbon county, Pa., to Fort Pitt Bridge Works, Pittsburgh; general contractor is Central Pennsylvania Quarry & Stripping Co., Hazelton, Pa.

675 tons, four state bridges, Ossipee-Tamworth, N. H., to Phoenix Bridge Co., Phoenixville, Pa.; Munroe-Langstroth, Inc., Norwood, Mass., subcontractor for bridges.

435 tons, building construction and alteration work, Texas Co., Deacon, N. Y., to Belmont Iron Works, Eddystone, Pa.

390 tons, warehouse, Westover field, Chicopee, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Granger Construction Co., Worcester, Mass., general contractor.

375 tons, New York state bridgework, Onondaga county, New York, through Savin Construction Corp., to Buffalo Structural Steel Co., Buffalo.

290 tons, heating and compressor plant, Erie Mining Co., Emco, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, high school, Schickchinny, Pa., to Anthracite Bridge Co., Scranton, Pa.

200 tons, West Glenside school, Cheltenham township, Pa., to Mayer Pollock & Sons, Pottstown, Pa.

250 tons, warehouse, Atlantic Refining Co., Point Breeze, Pa., to Max Corchin & Sons Inc., Philadelphia.

236 tons, hospital, Hempstead, Long Island, N. Y., through Bernard Associates, to Leib Iron Works, New York.

205 tons, recreation hall, New York University, New York, through William A. Berusse, that city, to Simon Holland & Son Inc., Brooklyn.

110 tons, 4-span beam bridge, Stony Brook, Suffield, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Della Bitta Sola Co., Plainville, Conn., general contractor.

STRUCTURAL STEEL PENDING

3980 tons, 25 bridges, Massachusetts turnpike, West Stockbridge—Stockbridge and Lee, Mass.; bids Mar. 31, Boston.

2500 tons, bridge, Westfield river, Massachusetts turnpike, Russell, Mass., bids Apr. 5, Boston.

2470 tons, including 1035 tons silicon steel, two bridges, including 5-span girder, Chicopee river, and 4-span stringer, Massachusetts turnpike, Ludlow-Wilbraham-Palmer, Mass.; bids Mar. 23, Boston.

745 tons, bridges, Massachusetts turnpike, Grafton and Millbury, Mass.; Gilbane Building Co., Providence, R. I., low, general contractor.

600 tons, overpass on the Pennsylvania side in connection with the Philadelphia-Gloucester bridge development of the Delaware River Port Authority, Laub Construction Co., low on general contract.

590 tons, four bridges, Massachusetts turnpike, Sturbridge, Mass.; bids Apr. 7, Boston.

325 tons, galvanized steel transmission towers, Seattle Light Department; bids Mar. 23.

260 tons, First National Bank building, Portland, Oreg.; bids in.

215 tons, 593-ft plate girder spans, Willamette river, Oregon; Hamilton & Thomas, Eugene, Oreg., general award at $108,890 by the Bureau of Public Roads, Portland, Oreg.

120 tons, state turnpike, section 37-H, Luzerne county, Pa., W. E. Graham, Cleveland, N. C., low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1040 tons, ten bridges, Massachusetts turnpike, Framingham, Mass., to Truscon Division,

(*Please turn to page* 189)

Period	OPEN HEARTH Net tons	OPEN HEARTH Per cent of capacity	OPEN HEARTH ‡Index	BESSEMER Net tons	BESSEMER Per cent of capacity	BESSEMER ‡Index	ELECTRIC Net tons	ELECTRIC Per cent of capacity	ELECTRIC ‡Index	TOTAL Net tons	TOTAL Per cent of capacity	TOTAL ‡Index	Calculated weekly production (Net tons)	Number of weeks in month
1955														
*January	8,054,345	86.0	125.7	199,229	49.0	56.7	584,162	83.6	163.6	8,837,736	82.7	124.2	1,994,974	4.43
†February	7,744,000	91.6	133.9	197,000	53.6	62.1	562,000	67.8	174.2	8,503,000	88.1	132.3	2,126,000	4.00
1954														
January	7,256,526	78.2	113.3	260,453	64.0	74.1	434,507	48.9	131.7	7,951,486	75.3	111.6	1,794,918	4.43
February	6,823,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
1st Quarter	20,729,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
April	6,365,326	70.9	102.7	162,657	41.3	47.8	442,954	51.5	128.2	6,970,937	68.1	101.3	1,624,927	4.29
May	6,817,951	73.6	106.4	198,063	48.7	56.4	456,724	51.4	127.9	7,472,738	70.7	105.0	1,686,848	4.43
June	6,702,006	74.7	108.1	207,666	52.7	61.1	453,962	52.8	131.3	7,363,634	72.0	107.0	1,716,465	4.29
2nd Quarter	19,885,283	73.1	105.8	568,386	47.6	55.1	1,353,640	51.9	129.1	21,807,309	70.3	104.4	1,676,196	13.01
1st Half	40,314,689	74.5	107.8	1,210,818	51.0	59.0	2,606,125	50.3	125.0	44,131,632	71.5	106.2	1,705,900	25.87
July	6,040,120	65.3	94.3	205,313	50.6	58.4	382,164	43.1	107.0	6,627,597	62.9	93.2	1,499,456	4.42
August	6,021,498	65.0	94.0	217,827	53.6	62.0	427,574	48.2	119.7	6,666,907	63.1	93.7	1,504,945	4.43
September	6,140,286	68.6	99.1	214,065	54.5	63.0	453,152	52.8	131.1	6,807,483	66.7	98.9	1,590,533	4.28
3rd Quarter	18,201,883	66.3	95.8	637,215	52.9	61.1	1,262,890	48.0	119.1	20,101,987	64.2	95.2	1,530,997	13.13
9th Month	58,516,571	71.7	103.7	1,848,033	51.6	59.7	3,869,015	49.5	123.0	64,233,619	69.1	102.5	1,647,016	39.00
October	6,973,568	75.2	108.9	237,754	58.5	67.7	490,211	56.2	137.3	7,701,533	72.9	108.3	1,738,495	4.43
November	7,307,151	81.4	117.9	231,191	58.7	68.0	551,085	64.1	159.4	8,089,427	79.1	117.5	1,885,647	4.29
December	7,530,204	81.4	117.6	231,126	57.0	65.8	525,743	59.4	147.2	8,287,073	78.6	116.5	1,874,903	4.42
4th Quarter	21,810,923	79.3	114.7	700,071	58.0	67.1	1,567,039	59.5	147.8	24,078,033	76.8	114.0	1,832,423	13.14
2nd Half	40,012,806	72.8	105.2	1,337,286	55.4	64.1	2,829,929	53.8	133.5	44,180,020	70.5	104.6	1,681,767	26.27
Total	80,327,494	73.6	106.5	2,548,104	53.2	61.6	5,436,054	52.0	129.3	88,311,652	71.0	105.4	1,693,741	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954, as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

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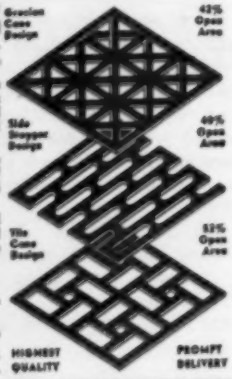

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Scrap . . .

Scrap Prices, Page 186

Chicago—As anticipated, the scrap market has firmed up here, with several important steelmaking grades and a few foundry items moving up $1 per ton. This followed an increase of $1 on No. 1 factory bundles the week preceding. The volume of trading has expanded little, however. At 97.5 per cent of capacity the last two weeks, district steelmaking is only a shade below the all-time high set in the week ended Apr. 4, 1953.

Chicago Mercantile Exchange hopes to begin trading in September and November steel scrap futures contracts within 30 days. The board of governors approved three major changes in rules. These include raising the trading unit from 40 to 80 tons, with other costs remaining unchanged, lowering the differential between No. 1 and No. 2 heavy melting from $5 to $3 per ton, and broadening the provicions for inspection of scrap tendered for delivery.

Philadelphia — The Fairless, Pa., consumer has purchased No. 1 heavy melting, No. 1 bundles and No. 1 busheling at $38.50, delivered, or $1 less than what it had paid a couple weeks ago. It also purchased No. 2 heavy melting at the unchanged level of $35, delivered, and No. 2 bundles at $31, down 50 cents.

As a result, the No. 1 grades of open-hearth steel are now holding at $38.50-$39.50. There is still enough tonnage open at the latter price to warrant a spread. The market is steady on No. 2 at $35. On No. 2 bundles it is generally lower at $31. Mixed borings and turnings are higher at $22. All other grades are unchanged.

Export business is off a little, reflecting in part possible change in government regulations. It appears that there will be no restriction on quantity, but there may be on quality.

Pittsburgh—A major consumer of No. 1 heavy melting continues to buy in the $38-$39 range which prevailed the last two weeks. There's no change in cast iron grades. Borings and turnings prices are unstable. Buying takes place at several prices, averaging $25-$26 for short shovel turnings and $21-$22 for machine shop turnings and mixed borings and turnings.

Cleveland—Substantial mill purchases here and in the Valley over the past week serve to put new strength into the local scrap market. A $2 per ton spread on the No. 1 steelmaking grades prevails at Cleveland, sales having been made at both $34 and $36. In the Valley substantial tonnage of electric furnace material was moved at $37-$38. The cast iron grades are firm with foundry strong.

Cincinnati—A generally stronger scrap market has developed here as the result of the local mill's purchases of 10,000 tons or more. No. 1 steel moved up 50 cents to $32.50-$33.50. No. 2 heavy melting advanced $1.50 to $29.50-$30.50. No. 2 bundles rose $1 to $24-$25. Short shovel turnings advanced $2 to $22-$23. Machine shop turnings rose $1.50 to $19-$20. Cast iron borings went up $1 to $20-$21.

Boston—Three prices are being paid by brokers for No. 1 heavy melting steel, shipping point. They depend on origin and freight, for eastern Pennsylvania, central Massachusetts and export. Firmness marks all three prices, with dock shipments up to $32-$33, delivered. No. 2 heavy melting for eastern Pennsylvania is higher at $27, shipping point, in 40-ton loads. Lighter grades are unchanged. No. 2 bundles are in heavy supply at some yards.

New York—Steel scrap is coming out a bit more freely, as is usual around spring of the year. This, combined with lower prices at Fairless, Pa., has resulted in lowering brokers' buying prices here to $32-$33 on No. 1 heavy melting and No. 1 bundles. Prices on other grades are steady.

Buffalo—Sustained buying boosted prices on cast scrap $1 per ton in the local market. Strength was shown last week in blast furnace grades, but prices are unchanged. Steelmaking grades are moving at a good clip against old orders.

Detroit — Scrap prices are unchanged from a week ago. Current-

(*Please turn to page* 188)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Mar. 16	$37.50
Mar. 9	37.33
Feb. Avg.	36.79
Mar. 1954	24.37
Mar. 1950	28.23

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	*30.00-31.00*
No. 1 busheling	38.00-39.00
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Cut structurals, 5 ft lengths	41.00-42.00
Heavy turnings	*35.00-36.00*
Punchings & plate scrap	42.00-43.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Charging box cast	32.00-33.00
Heavy breakable cast	32.00-33.00
Unstripped motor blocks	22.00-23.00
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt	40.00-41.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Rails, random lengths	46.00-47.00
Railroad specialties	44.50-45.50

Stainless Steel Scrap

18-8 bundles & solids	210.00-220.00
18-8 turnings	105.00-110.00
430 bundles & solids	95.00-100.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*34.00-36.00*
No. 2 heavy melting	31.00-32.00
No. 1 bundles	*34.00-36.00*
No. 3 bundles	28.00-29.00
No. 1 busheling	*34.00-36.00*
Machine shop turnings	17.00-18.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Low phos.	*34.00-36.00*
Cut structural plate 2 ft and under	*42.00-43.00*
Alloy free, short shovel turnings	26.50-27.50
Electric furnace bundles	*34.00-36.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Charging box cast	37.00-38.00
Stove plate	42.00-43.00
Heavy breakable cast	34.00-35.00
Unstripped motor blocks	29.00-30.00
Brake shoes	32.00-33.00
Clean auto cast	46.00-47.00
No. 1 wheels	43.00-44.00
Burnt cast	33.00-34.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt	37.00-38.00
R.R. malleable	45.00-46.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Rails, random lengths	45.00-46.00
Cast steel	39.00-40.00
Railroad specialties	39.00-40.00
Uncut tires	41.00-42.00
Angles, splice bars	46.00-47.00
Rails, rerolling	52.00-53.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	100.00-200.00
18-8 turnings	80.00-90.00
430 clips, bundles, solids	80.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	*37.00-38.00*
No. 2 bundles	27.50-28.50
No. 1 busheling	*37.00-38.00*
Machine shop turnings	18.00-19.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Low phos.	37.00-38.00
Electric furnace bundles	*37.00-38.00*

Railroad Scrap

No. 1 R.R. heavy melt	38.00-39.00

CHICAGO

No. 1 heavy melting	*34.00-36.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 factory bundles	37.00
No. 1 dealer bundles	*34.00-35.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	*34.00-36.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*19.00-20.00*
Short shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut structurals, 3 ft	*36.00-37.00*
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	39.00-41.00
Stove plate	*35.00-36.00*
Unstripped motor blocks	28.00-29.00
Clean auto cast	*45.00-46.00*
Drop broken machinery	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt	*37.00-38.00*
R.R. malleable	44.00-45.00
Rails, 2-ft and under	47.00-48.00
Rails, 18-in. and under	48.00-49.00
Angles, splice bars	43.00-44.00
Rails, rerolling	49.00-50.00

Stainless Steel Scrap

18-8 bundles & solids	205.00-210.00
18-8 turnings	95.00-100.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50
No. 2 heavy melting	22.00
No. 1 bundles	29.00
No. 2 bundles	21.00
No. 1 busheling	28.00
Machine shop turnings	13.00
Mixed borings, turnings	13.00
Short shovel turnings	17.00
Punchings & plate scrap	30.00

Cast Iron Grades

Charging box cast	27.00
No. 1 cupola	34.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	38.00
Malleable	30.00

BIRMINGHAM

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	27.00-28.00
No. 1 bundles	*32.00-33.00*
No. 2 bundles	23.00-24.00
No. 1 busheling	*32.00-33.00*
Cast iron borings	*17.00-18.00*
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	36.00-37.00
Structural plate, 2 ft	36.00-37.00
Unstripped motor blocks	35.50-36.50

Railroad Scrap

No. 1 R.R. heavy melt	*36.00-37.00*
Rails, 18-in and under	42.00-43.00
Rails, rerolling	43.00-44.00
Rails, random lengths	*39.00-40.00*
Angles, splice bars	*40.00-41.00*
Stand. steel axles	33.00-36.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*33.50-39.50*
No. 2 heavy melting	35.00
No. 1 bundles	*33.50-39.50*
No. 2 bundles	*31.00*
No. 1 busheling	*33.50-39.50*
Electric furnace bundles	41.00
Machine shop turnings	23.50
Mixed borings, turnings	*22.00*
Short shovel turnings	25.50
Structurals & plate	42.00-43.00
Heavy turnings	34.00-35.00
Couplers, springs, wheels	42.50
Rail crops, 2 ft & under	52.00-53.00

Cast Iron Grades

No. 1 cupola	38.00
Malleable	44.00
Heavy breakable cast	38.50-39.00
Drop broken machinery	44.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*32.50-33.00*
No. 2 heavy melting	30.00-31.00
No. 1 bundles	*32.50-33.00*
No. 2 bundles	24.00-25.00
Machine shop turnings	14.00-15.00
Mixed borings, short turnings	15.00-16.00
Short shovel turnings	16.00-17.00
Low phos. (structural & plate)	35.00-36.00

Cast Iron Grades

No. 1 cupola	30.00-31.00
Unstripped motor blocks	22.00-23.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	175.00-180.00
18-8 borings, turnings	85.00-90.00
430 sheets, clips, solids	60.00-65.00
410 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.50-30.00
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	29.50-30.00
No. 2 bundles	22.00-23.00
Mixed borings, turnings	*14.50-15.00*
Mixed shop turnings	11.00-12.00
Short shovel turnings	15.50-16.00
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	33.00-34.00

BUFFALO

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	32.00-33.00
No. 2 bundles	27.00-28.00
No. 1 busheling	32.00-33.00
Machine shop turnings	20.50-21.50
Short shovel turnings	23.00-24.00
Cast iron borings	22.00-23.00
Low phos.	36.00-37.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*37.00-38.00*
No. 1 machinery	*42.00-43.00*

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-42.00
Railroad specialties	36.50-37.50

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.50-33.50*
No. 2 heavy melting	*29.50-30.50*
No. 1 bundles	*32.50-33.50*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*32.50-33.50*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	19.00-20.50
Short shovel turnings	*22.00-23.00*
Cast iron borings	*20.00-21.00*
Low phos. 18-in.	38.00-39.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt	35.00-36.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths	41.50-42.50

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	31.00
No. 2 bundles	24.50
Machine shop turnings	15.00
Short shovel turnings	17.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	32.50
Heavy breakable cast	32.50
Unstripped motor blocks	32.50
Brake shoes	32.00
Clean auto cast	42.50
Stove plate	36.50

Railroad Scrap

No. 1 R.R. heavy melt	35.50
Rails, 18-in. and under	46.00
Rails, random lengths	40.00-41.00
Rails, rerolling	46.00
Angles, splice bars	41.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	31.00
No. 2 heavy melting	27.00
No. 1 bundles	22.50
No. 2 bundles	20.00
No. 3 bundles	14.00
Machine shop turnings	12.00-14.00
Mixed borings, turnings	12.00-14.00
Short shovel turnings	12.00-14.00
Electric furnace, No. 1	35.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	35.50-38.00
Heavy breakable cast	23.00
Unstripped motor blocks	27.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00-29.00
Brake shoes	28.00-29.00

Railroad Scrap (Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	28.00
No. 2 heavy melting	24.00
No. 1 bundles	27.00
No. 2 bundles	22.00
Machine shop turnings	8.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	27.00
No. 2 heavy melting	25.00
No. 1 bundles	26.00
No. 2 bundles	22.00
No. 1 busheling	27.00
Machine shop turnings	8.00
Mixed borings, turnings	8.00
Short shovel turnings	*10.00*
Cast iron borings	*10.00*
Cut structurals	27.00
Heavy turnings	9.00
Punchings & plate scrap	27.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	36.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

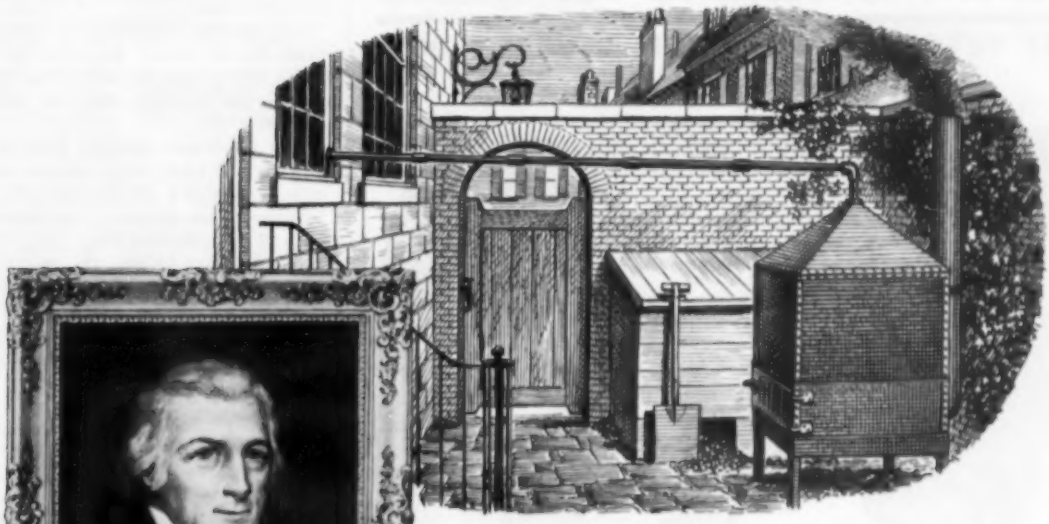
No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	32.00
No. 2 bundles	26.00
Mixed steel scrap	26.00
Mixed borings, turnings	12.00
Rails, remelting	41.00
Busheling, new factory: Prepared	30.00
Unprepared	26.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



Murdock's backyard experimental gas plant using joined gun barrels to pipe the gas into his home . . . . . This is the sixth in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1792

The Lighting of Coal Gas

William Murdock

When William Murdock succeeded in pumping gas from an iron retort through a series of gun barrels, he paraphrased "oil for the lamps of China" to "gas for the streets of London."

Murdock's feat of threading together the ends of gun barrels into a continuous pipeline resulted in the flow of illuminating gas for lighting the gloomy streets of London. His system proved so popular it stimulated an immediate demand for cheaper and faster ways for producing iron tubes.

Through the years, piping systems to meet modern industrial needs for plumbing, heating, transportation and structural purposes improved at a rapid rate. Today, the demand for pipe requires approximately 10 to 12 percent of total steel production.

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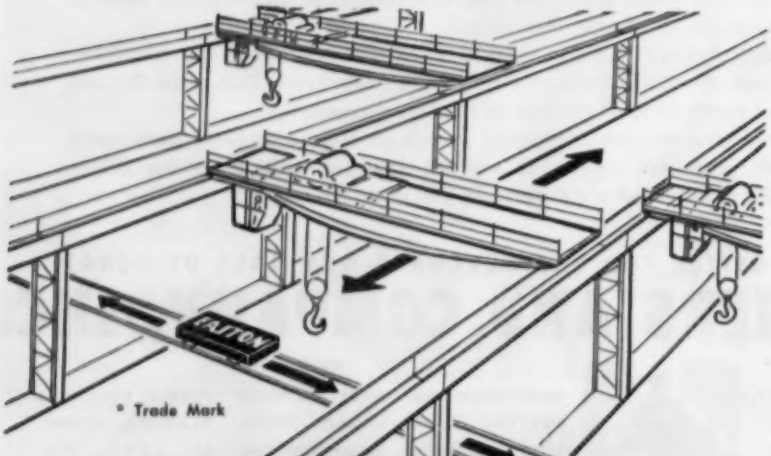

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A-1041

EASTON

EASTON CAR & CONSTRUCTION COMPANY · EASTON, PA. · NEW YORK · PHILADELPHIA · PITTSBURGH

(*Concluded from page* 185)

ly, the market is in its usual mid-month quiet, between issuance of automotive lists.

Los Angeles—Reports of negotiations for increased imports of offshore scrap have unsettled the market in this district. However, prices are fairly firm.

San Francisco—Export demand is keeping the steel scrap market alive here. Mills are taking virtually no tonnage. One producer operated at only 21 per cent last week, and, in effect, was down to zero the week preceding because of an ingot surplus.

Seattle—Export activity is holding up the scrap market in this area. Dealers are reported holding commitments for two full cargoes of scrap for Japan. The March loading will be here and in Portland.

The Thirteenth Naval District, Seattle, has closed negotiations for the sale of 35,000 tons of scrap and equipment salvage in the Aleutians. Details are not available, but a local report has the contract approximating $300,000.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 168

Heavier volume business is reported in the reinforcing market, reflecting the beginning of the spring building season. Indications are demand will be strong over the coming months as public and private work, including road construction, gets under way. Expectations are the stronger demand now developing will serve to strengthen prices. In New England, however, placement of 5000 tons for the Massachusetts turnpike did not firm up the market. The bulk of the tonnage went to distributors at 2.50c to 3.50c a pound under contractors' estimates.

Pig Iron . . .

Pig Iron Prices, Page 173

Merchant pig iron business is being sustained at the level of the last two or three weeks. The modest uptrend which began early in the year is expected to be resumed shortly as cast iron pipe mills are becoming more active seasonally in line with rising construction.

The strong ingot production rate is providing support to blast furnace operations, with producers tending to use more hot metal in their melts as an offset to high scrap prices.

Six hundred tons of foundry iron are being recovered from a barge which recently sank at the pier of the Chester blast furnace, Chester, Pa. The iron is scheduled for delivery to a Delaware river pipe foundry.

(*Concluded from page* 183)

Republic Steel Corp., Boston; M. DeMatteo Construction Co., Quincy, Mass., general contractor.

940 tons, highway and seven bridges, Massachusetts turnpike, Charlton-Oxford-Auburn, Mass. to Truscon Division, Republic Steel Corp., Boston; Monroe-Langstroth, Inc., Norwood, Mass., subcontractor for bridges.

990 tons, ten bridges, Massachusetts turnpike, Grafton-Upton-Westboro-Hopkinton, Mass., to Plantations Steel Co., Providence, R. I.; Gilbane Building Co., Providence, general contractor.

750 tons, five bridges, Massachusetts turnpike, Sturbridge-Charlton, Mass., to Truscon Division, Republic Steel Corp., Boston; Munroe-Langstroth, Inc., Norwood, Mass., general contractor.

700 tons, hospital addition, Duke University, Durham, N. C., to Easterly & Murrow, Atlanta; F. N. Thompson, Inc., Raleigh, N. C., general contractor.

665 tons, three bridges, Massachusetts turnpike, Chicopee, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Grand View Construction Co., Mount Vernon, N. Y., general contractor.

650 tons, state bridges, including beam-girder span, Neponset river, Boston-Quincy-Milton, Mass., to Northern Steel Co., Medford, Mass.; Marinucci Bros. & Co., Inc., Boston, general contractor.

600 tons, Washington state South Bay bridge, Gray's Harbor county, to Northwest Steel Rolling Mills Inc., Seattle; Peter Kiewit Sons Co., Longview, Wash., general contractor at $694,914.

470 tons, five bridges, Massachusetts turnpike, Palmer, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Grand View Construction Co., Mount Vernon, N. Y., general contractor.

400 tons, junior high school, New Bedford, Mass., to Northern Steel Co. Inc., Medford, Mass.; Vara Construction Co., Boston, general contractor.

230 tons, National Bank of Commerce, Central branch, Seattle, to Soule Steel Co., Seattle; Haddock Engineers Inc., general contractors.

185 tons, municipal building, Baton Rouge, La., to Southwest Steel Products, Inc., New Orleans; J. A. Jones Construction Co., Shreveport, La., general contractor.

175 tons, courthouses, Whitman and Kittitas counties, Washington state, to Northwest Steel Rolling Mills Inc., Seattle.

140 tons, building, University of Montana, Missoula, Mont., to Soule Steel Co., Seattle; Pew Construction Co., Missoula, general contractor.

115 tons, laterals, Columbia Basin project, to Bethlehem Pacific Coast Steel Corp., Seattle; Valley Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

2465 tons, 25 bridges and three culverts, Massachusetts turnpike, West Stockbridge-Stockbridge-Lee, Mass., also 100 tons, steel sheet piling; bids Mar. 31, Boston.

715 tons, bridges, Massachusetts turnpike, Grafton and Millbury, Mass.; Gilbane Building Co., Providence, R. I., low, general contract.

675 tons, two bridges, including 5-span girder, Chicopee river, Ludlow-Wilbraham-Palmer, Mass.; bids Mar. 23, Boston.

565 tons, four bridges, Massachusetts turnpike, Sturbridge, Mass.; bids Apr. 7, Boston.

500 tons (estimated), Oregon state, 16 road jobs totaling $758,559; general contracts awarded.

250 tons, Greene street state bridge, Spokane, Wash.; Henry Hagman, Cashmere, Wash., general contract at $359,328.

225 tons, substructure, State street bridge, Connecticut river, Hartford-East Hartford, also 200 tons, 12 and 16-in. steel pipe piling.

130 tons, guard house and stockade, Ft. Lewis, Wash.; bids Mar. 25.

100 tons, also steel for siphons, laterals main canal, Kennewick Division, Yakima project, Washington state; bids to be asked by Denver about Mar. 17.

RAILS, CARS . . .

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Montana & Western, one 550-hp, 80-ton diesel-electric locomotive, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

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WANT CONNECTION with a Steel Mill to sell Steel Mill Products, New York and Philadelphia territory, Commission Basis. Reply Box 228, STEEL, Penton Building, Cleveland 13, Ohio.

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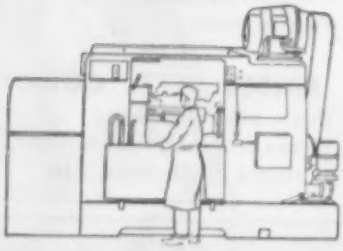

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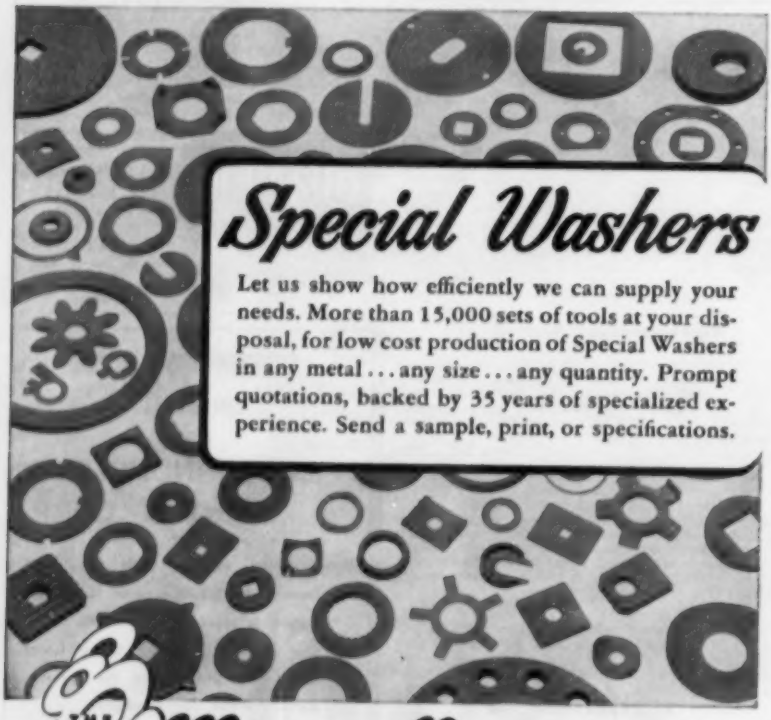
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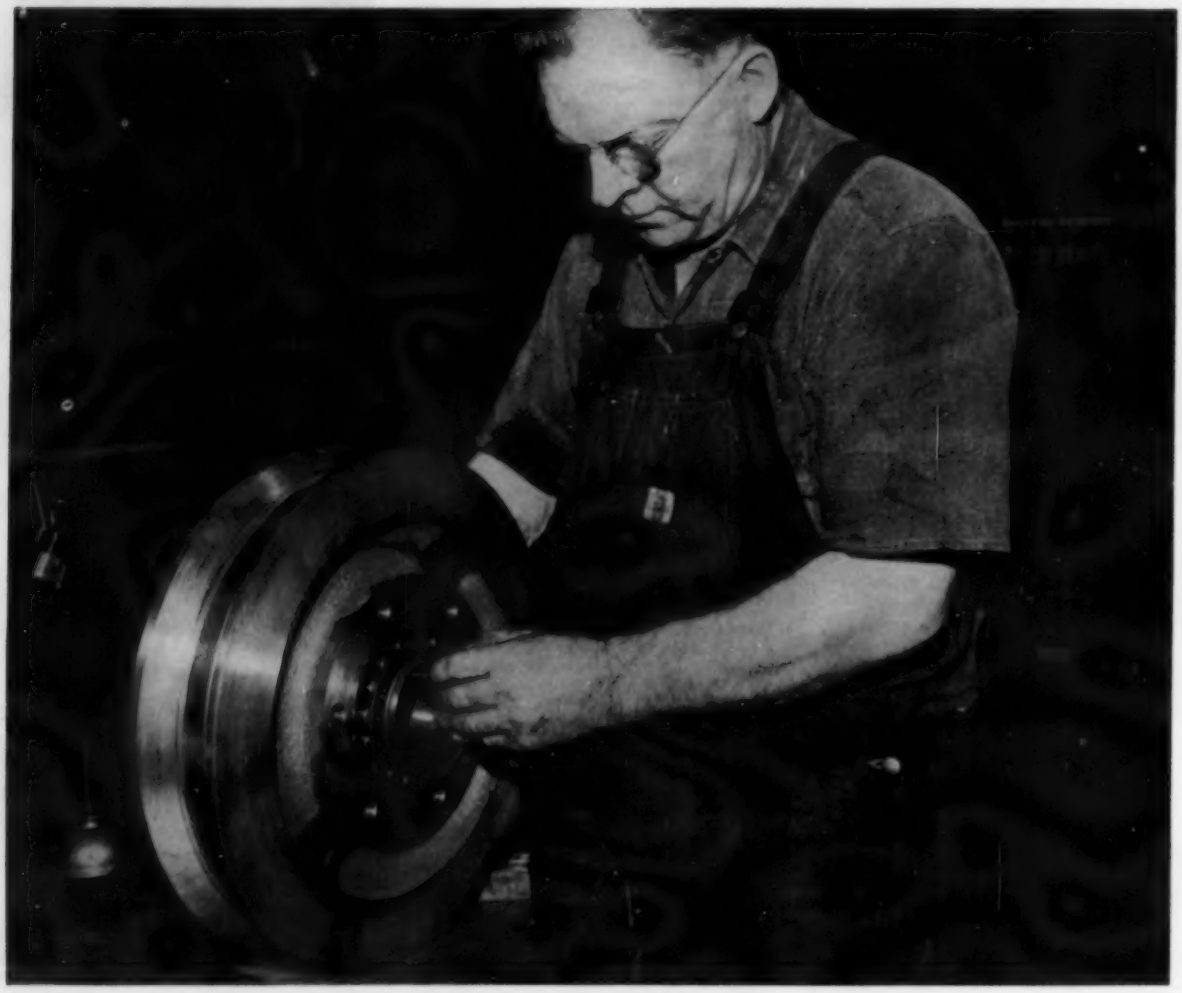

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BETHLEHEM STEEL

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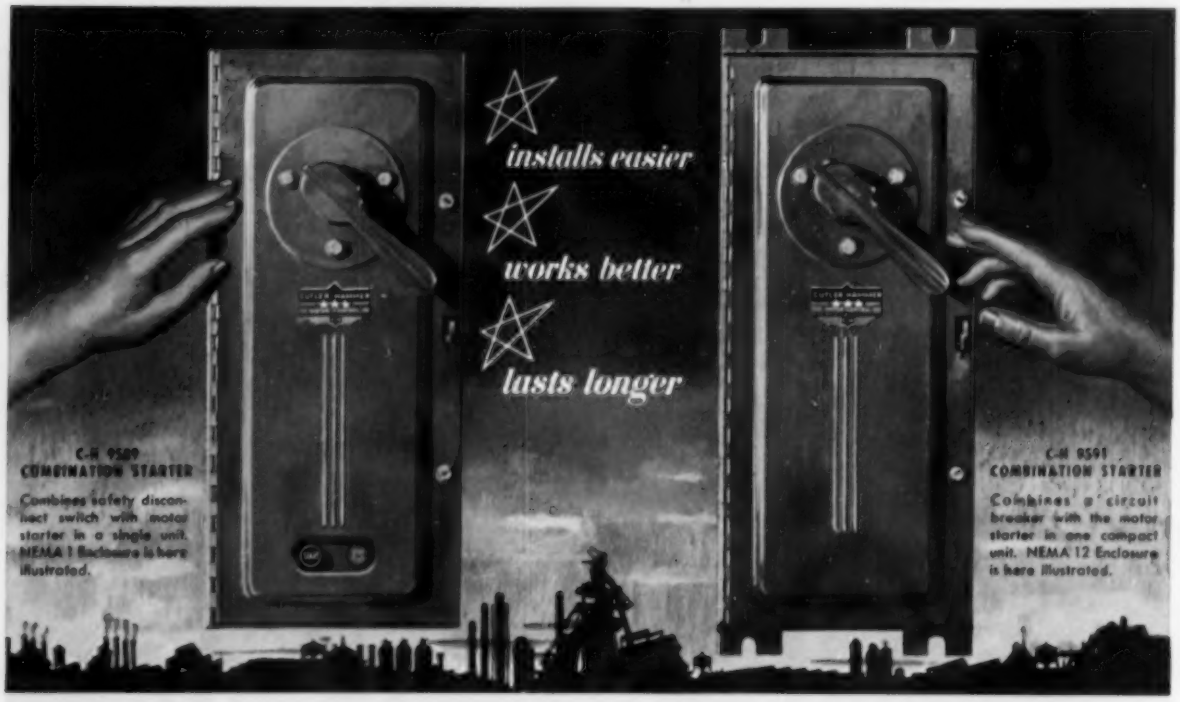
Worm Gear
Speed Reducers

WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

New Combination Starters in the Spectacular Line of Cutler-Hammer ★★★ Motor Control


installs easier
works better
lasts longer
C-H 9589
COMBINATION STARTER
Combines safety disconnect switch with motor starter in a single unit. NEMA 1 Enclosure is here illustrated.
C-H 9591
COMBINATION STARTER
Combines a circuit breaker with the motor starter in one compact unit. NEMA 12 Enclosure is here illustrated.

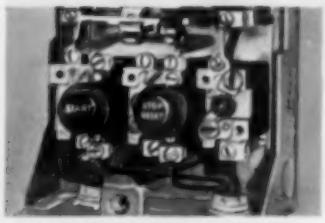
Users have had many dramatic proofs of the advantages built into Cutler-Hammer ★ ★ ★ Motor Control. They *know* the three silver stars on the Cutler-Hammer nameplate identify control equipment that sets three entirely new standards of motor control performance and value.

Star #1: Amazing savings in installation costs which often exceed the cost of the control. Star #2: Performance so uniform and dependable that *this* control often saves many times its cost by the production interruptions it avoids. Star #3: Life so greatly increased that this control *never* requires maintenance expense in 90% of its uses.

Now combination starters are available in this spectacular new line of Cutler-Hammer ★ ★ ★ Motor Control. Your nearby Cutler-Hammer Authorized Distributor has been stocked and is ready to serve you. Bulletin 9589 Starters incorporate a rugged disconnect switch of advanced design with or without fuses. Bulletin 9591 Starters are equipped with circuit breakers. Order *now* for prompt delivery.

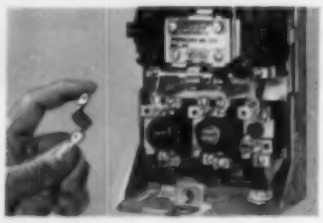
CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin.

CUTLER-HAMMER
☆ ☆ ☆
MOTOR CONTROL
C-H



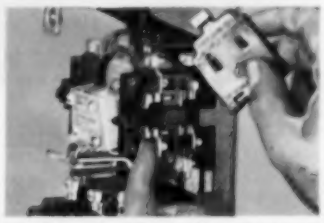
Full Three-Phase Protection

Only three overload relays can give complete three-phase protection to avoid motor burn-outs and their costly interruptions to production. And only Cutler-Hammer offers this complete three-phase protection in standard combination starters. You pay only for the third relay, nothing extra for special engineering or special enclosures.



Adjustable Load Sensing Coils

The accurate adjustment of overload protection permits motors to work harder without damage to motor windings. This is more important than ever with the newer type small frame motors. Adjustable load sensing coils in these new starters provide 3% loading accuracy instead of the 10% to 12% accuracy in competitive control.



Superlife Vertical Contacts

Experienced control users insist on dust-safe vertical contacts. And now the famous Cutler-Hammer vertical contacts have been doubly improved. First, their new lightweight design cuts bounce to reduce arcing. Second, any arcing that might occur is now pressure-quenched. Compare performance and see the difference.